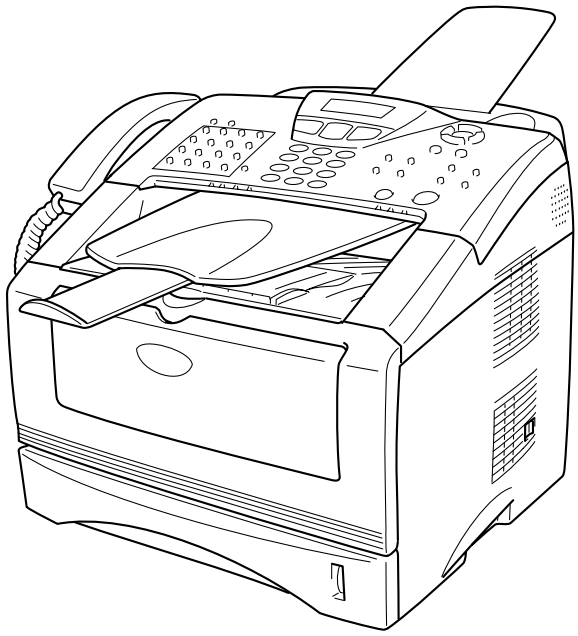
SERVICE MANUAL

MODEL: MFC-8220



Read this manual thoroughly before maintenance work.

Keep this manual in a convenient place for quick and easy reference at all times.

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PREFACE

This publication is a Service Manual covering the specifications, construction, theory of operation, and maintenance of the Brother machine. It includes information required for field troubleshooting and repair--disassembly, reassembly, and lubrication--so that service personnel will be able to understand machine function, to rapidly repair the machine and order any necessary spare parts.

To perform appropriate maintenance so that the machine is always in best condition for the customer, the service personnel must adequately understand and apply this manual.

This manual is made up of six chapters and appendices.

CHAPTER 1: GENERAL

CHAPTER 2: INSTALLATION AND BASIC OPERATION

CHAPTER 3: THEORY OF OPERATION

CHAPTER 4: DISASSEMBLY AND RE-ASSEMBLY

CHAPTER 5: PERIODIC MAINTENANCE

CHAPTER 6: TROUBLESHOOTING

CHAPTER 7: MAINTENANCE MODE

APPENDIX 1: EEPROM CUSTOMIZING CODES

APPENDIX 2: INSTALLING THE UPDATE DATA

APPENDIX 3: FIRMWARE SWITCHS (WSW)

APPENDIX 4: CIRCUIT DIAGRAMS

Information in this manual is subject to change due to improvement or redesign of the product. All relevant information in such cases will be supplied in service information bulletins (Technical Information).

A thorough understanding of this printer, based on information in this service manual and service information bulletins, is required for maintaining its print quality performance and for improving the practical ability to find the cause of problems.

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REGULATION

LASER SAFETY (110 - 120V MODEL ONLY)

This printer is certified as a Class I laser product under the US Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

Since radiation emitted inside the printer is completely confined within the protective housing and external covers. the laser beam cannot escape form the machine during any phase of user operation.

FDA REGULATIONS (110 - 120V MODEL ONLY)

The US Food and Drug Administration (FDA) has implemented regulations for laser products manufactured on and after August 2, 1976. Compliance is mandatory for products marketed in the United States. One of the following labels on the back of the printer indicates compliance with the FDA regulations and must be attached to laser products marketed in the United States.

The label for Japanese manufactured products

MANUFACTURED: K
BROTHER INDUSTRIES, LTD.

15-1, Naeshiro-cho, Mizuho-ku, Nagoya 467-8561, Japan.
This product complies with FDA radiation performance standards, 21 CFR Subchapter J.

The label for Chinese manufactured products

MANUFACTURED: C
BROTHER Corporation (Asia) Ltd.
Shenzen Buji Nan Ling Factory

Gold Garden Ind., Nan Ling Village, Buji, Rong Gang, Shenzen, CHINA
This product complies with FDA radiation performance standards, 21 CFR Subchapter J.

Caution
Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

IEC 825 (220-240V MODEL ONLY)

This printer is a Class I laser product as defined in IEC 825 specifications. The label shown below is attached in countries where required.

This printer has a laser diode which emits invisible laser radiation in the Laser Unit. The Laser Unit should not be opened without disconnecting the two connectors connected with the AC power supply and laser unit. Since the variable resistor in the laser unit is adjusted in accordance with the standards, never touch it.

Caution
Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

For Finland and Sweden
LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

Varoitus! Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

Varning – Om apparaten används på annat sätt än i denna Bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

SAFETY INFORMATION

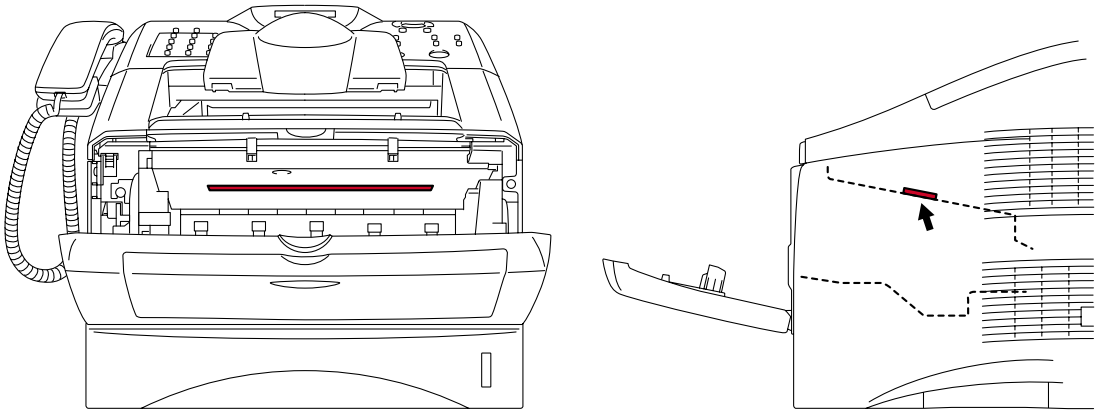
CAUTION FOR LASER PRODUCT (WARNHINWEIS FUR LASER DRUCKER)

CAUTION: When the machine during servicing is operated with the cover open, the regulations of VBG 93 and the performance instructions for VBG 93 are valid.

CAUTION: In case of any trouble with the laser unit, replace the laser unit itself. To prevent direct exposure to the laser beam, do not try to open the enclosure of the laser unit.

ACHTUNG: Im Falle von Störungen der Lasereinheit muß diese ersetzt werden. Das Gehäuse der Lasereinheit darf nicht geöffnet werden, da sonst Laserstrahlen austreten können.

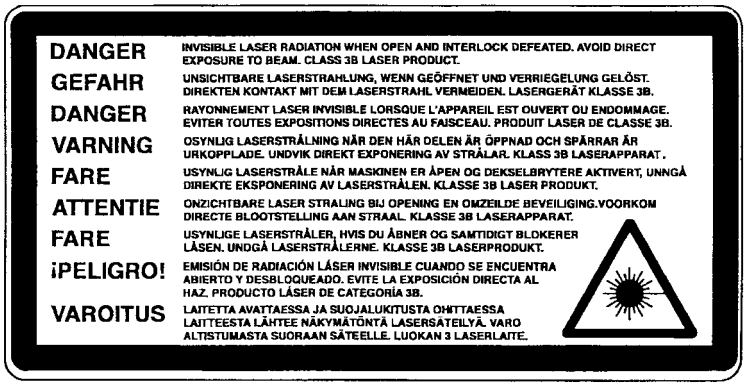
<Location of the laser beam window>



ADDITIONAL INFORMATION

When servicing the optical system of the printer, be careful not to place a screwdriver or other reflective object in the path of the laser beam. Be sure to take off any personal accessories such as watches and rings before working on the printer. A reflected beam, though invisible, can permanently damage the eyes.

Since the beam is invisible, the following caution label is attached on the laser unit.


DANGER
INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED. AVOID DIRECT EXPOSURE TO BEAM. CLASS 3B LASER PRODUCT.
GEFAHR
UNSICHTBARE LASERSTRAHLUNG, WENN GEÖFFNET UND VERRIEGELUNG GELÖST. DIREKTEN KONTAKT MIT DEM LASERSTRAHL VERMEIDEN. LASERGERÄT KLASSE 3B.
DANGER
RAYONNEMENT LASER INVISIBLE LORSQUE L'APPAREIL EST OUVERT OU ENDOMMAGE. EVITER TOUTES EXPOSITIONS DIRECTES AU FAISCEAU. PRODUIT LASER DE CLASSE 3B.
VARNING
OSYNLIG LASERSTRÅLNING NÄR DEN HÄR DELEN ÄR ÖPPNAD OCH SPÄRRAR ÄR URKOPPLADE. UNDVIK DIREKT EXPONERING AV STRÅLAR. KLASS 3B LASERAPPARAT.
FARE
USYNLIG LASERSTRÅLE NÅR MASKINEN ER ÅPEN OG DEKSELBRYTERE AKTIVERT, UNNGÅ DIREKTE EKSPONERING AV LASERSTRÅLEN. KLASSE 3B LASER PRODUKT.
ATTENTIE
ONZICHTBARE LASER STRALING BIJ OPENING EN OMZEILDE BEVEILIGING.VOORKOM DIRECTE BLOOTSTELLING AAN STRAAL. KLASSE 3B LASERAPPARAT.
FARE
USYNLIGE LASERSTRÅLER, HVIS DU ÅBNER OG SAMTIDIGT BLOKERER LÅSEN. UNDGÅ LASERSTRÅLERNE. KLASSE 3B LASERPRODUKT.
¡PELIGRO!
EMISIÓN DE RADIACIÓN LÁSER INVISIBLE CUANDO SE ENCUENTRA ABIERTO Y DESBLOQUEADO. EVITE LA EXPOSICIÓN DIRECTA AL HAZ. PRODUCTO LÁSER DE CATEGORÍA 3B.
VAROITUS
LAITETTA AVATTAESSA JA SUOJALUKITUSTA OHITTAESSA LAITTEESTA LÄHTEE NÄKYMÄTÖNTÄ LASERSÄTEILYÄ. VARO ALTISTUMASTA SUORAAN SÄTEELLE. LUOKAN 3 LASERLAITE.

DEFINITIONS OF WARNINGS, CAUTIONS AND NOTES

The following conventions are used in this service manual:

> ***WARNING***
>
> ***Indicates warnings that must be observed to prevent possible personal injury.***

> ***CAUTION:***
>
> *Indicates cautions that must be observed to service the printer properly or prevent damage to the printer.*

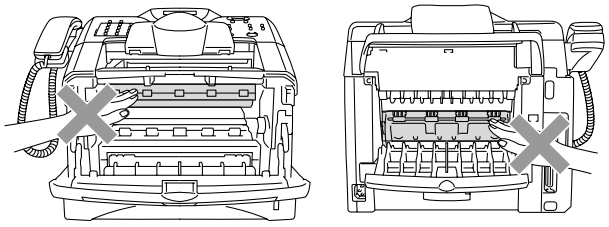
NOTE:

Indicates notes and useful tips to remember when servicing the printer.

**Listed below are the various kinds of “WARNING” messages included in this manual.

> ***WARNING***
>
> ***Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.***

> ***WARNING***
>
> ***Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or back cover to access any parts inside the printer, never touch the shaded parts shown in the following figures.***



> ***WARNING***
>
> ***If you analyze malfunctions with the power plug inserted into the power outlet, special caution should be exercised even if the power switch is OFF because it is a single pole switch.***

CHAPTER 1 GENERAL

1. OVERVIEW

<Front View>

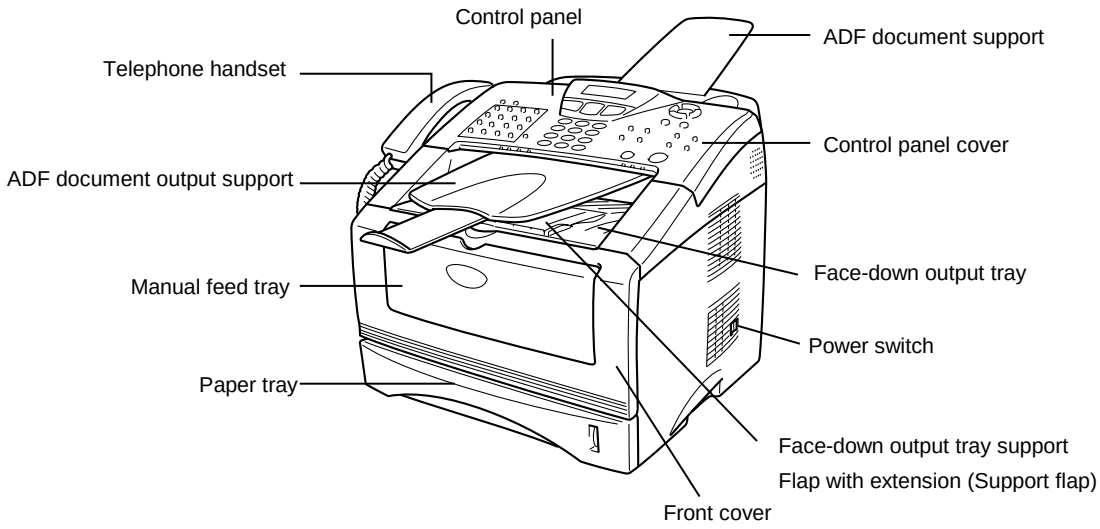


Fig. 1-1

<Back View>

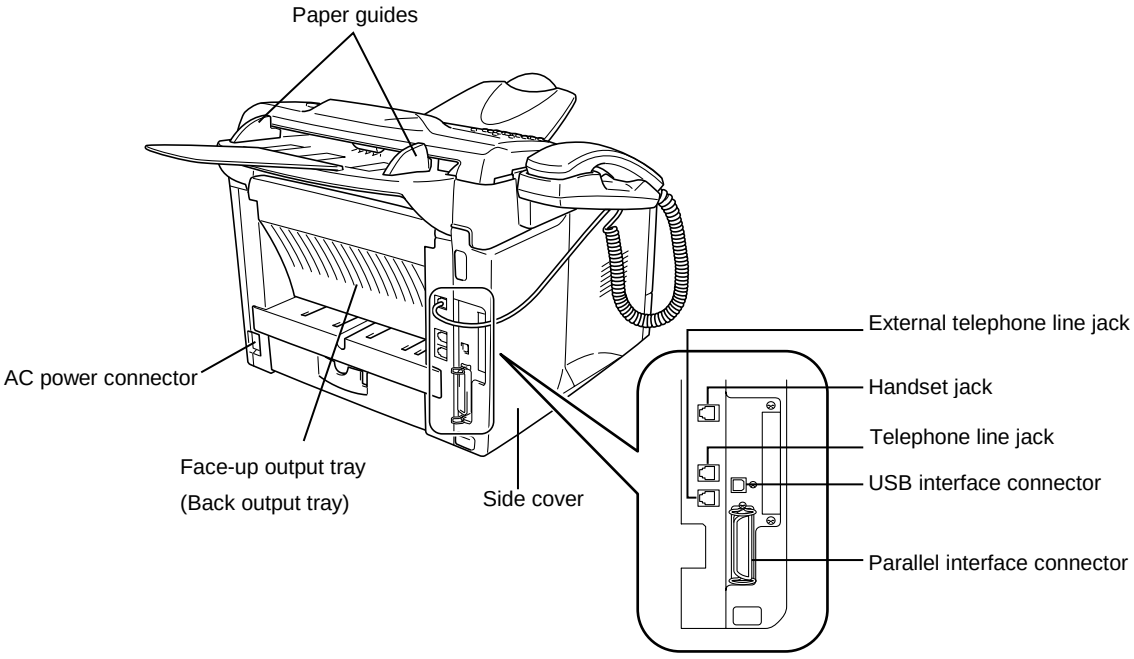


Fig. 1-2

2. SPECIFICATIONS

2.1 General

Memory Capacity	32 MB
Optional Memory	DIMM slot; Max. 160 MB
ADF	Up to 30 pages
Paper Tray	250 Sheets (20lb)
Printer Type	Laser
LCD	16 characters x 2 lines
Warm-up	Max. 18 seconds at 73.4°F (23°C)
Power Source	120V AC 50/60Hz (U.S.A., Canada Version only) 220 to 240V AC 50/60Hz (Europe Version only)
Power Consumption	Average Operating (Copying): 440W or less, 25°C, Plain paper Peak: 1090W or less Sleep: 6W or less Standby: 75W or less (25°C)
Dimensions	431 x 451 x 335 (mm) (U.S.A., Canada Version only) 375 x 451 x 335 (mm) (Europe Version only)
Weight	Without Drum/Toner Unit: 11.6kg
Noise	Operating: 53dBA or less Standby: 30dBA or less

2.2 Environment of Installation Site

Temperature	50 to 90.5°F (10 to 32.5°C)
Humidity	20 to 80% (without condensation)

2.3 Paper

Paper Input

< Paper Tray >

- Paper type:
  Plain paper, Transparency
- Paper size:
  A4, Letter, JIS B5, A5, ISO B5, A6, LGL, ISO B6, EXE
  Weight: 16 to 28lb (60 to 105g/m^2)
- Maximum number of paper to be loaded:
  Approx. 250 sheets of 20lb (80g/m^2)

< Manual Feed Tray >

- Paper size:
  Width: 20lb 2.75 to 8.66" (69.8 to 220.0mm)
  Height: 4.60 to 14.02" (116.0 to 406mm)
  Weight: 16 to 43lb (60 to 161g/m^2)
- Maximum number of paper to be loaded on the manual feed tray:
  1 sheet

Paper Output

Maximum number of sheets to be output to the delivery tray: In the case of face-down delivery, up to 150 sheets of plain paper (80g/m^2). In the case of face-up delivery, up to 1 sheet of plain paper (80g/m^2).

2.4 Copy

Color/Monochrome	Monochrome
Copy Speed	Up to 21cpm (Letter size) (U.S.A., Canada Version only) Up to 20cpm (A4 size) (Europe Version only)
Multiple Copies	Up to 99 pages
Enlarge/Reduce	25% to 400% (in increments of 1%)
Resolution	600dpi

2.5 Fax

Compatibility	Super G3
Coding System	MH/MR/MMR/JBIG
Modem Speed	33600bps
Original Size	ADF Width: 5.8" to 8.5" (148mm to 216mm) ADF Height: 3.9" to 14.0" (100mm to 356mm)
Scanning Width	208mm x 291mm
Printing Width	203mm x 291mm
Gray Scale	256 levels
Polling Types	Standard, Confidential, Sequential, Timer
Contrast Control	Automatic/Light/Dark (manual setting)
Resolution	Horizontal: 203 dot/inch (8 dot/mm) Vertical: • Standard: 98 line/inch (3.85 line/mm) • Fine, Photo: 196 line/inch (7.7 line/mm) • Superfine: 392 line/inch (15.4 line/mm)
One-Touch Dial	32 (16 x 2)
Speed-Dial	300 stations
Automatic Redial	Three times
Auto Answer	0 to 10 rings
Memory Transmission	Up to 600 pages (Brother #1 Chart)
Out of Paper Reception	Up to 600 pages (Brother #1 Chart)

2.6 Specifications for Document Feeding System

2.6.1 Specifications for document

Length of document		100mm to 360mm
Width of document		148mm to 216mm
Weight of document	ADF	64 to 90g/m^2 (17 to 24lb)
	1 sheet	52 to 90g/m^2 (14 to 24lb)
Thickness of document	ADF	0.07mm to 0.12mm
	1 sheet	0.06mm to 0.12mm

2.6.2 Specifications for ADF

ADF method	Friction separation using round rollers and separation pads		
Number of sheets handled by ADF (max)	XEROX 4024DP	20lb	30 sheets (Letter) *1
		24lb	20 sheets (Letter)
	XEROX 4200	20lb	30 sheets (Letter) *1

*1: Be sure to place the edge of sheets in a wedge shape in the environment with temperature of 20 to 30 degree C and humidity of 50 to 70%.

The maximum number of sheets is 20 in the other environments.

2.7 Printer

Printer Driver
Windows® 95/98/98SE/Me/2000 Professional/XP/NT 4.0 Workstation Version 4.0 driver supporting Brother Native Compression mode and bi-directional capability
Apple® Macintosh® Quick Draw® Driver and PostScript (PPD) for OS 8.6-9.2/OS X 10.1/10.2.1 or Greater

Resolution
HQ1200 (Max. 2400 x 600 dots/inch)

Print Speed
Up to 20cpm (A4 size)

2.8 Interfaces

Interface
Recommended Cable

Parallel cable
A bi-directional shielded parallel cable that is IEEE 1284 compliant and not longer than 6 feet (2m).

USB cable
A Hi-Speed USB 2.0 cable that is not longer than 6 feet (2m).

NOTE:

- *Please make sure that you use a Hi-Speed USB 2.0 certified cable if your computer uses a Hi-Speed USB 2.0 interface.*
- *Even if your computer has a USB 1.1 interface you can connect the MFC.*
- *To meet FCC/CISPR emission requirements for the MFC, you must attach the included filter core and cable tie to the parallel interface cable.*

2.9 Consumable Items

Toner Cartridge Life Expectancy
TN-540/TN-3030: Standard toner cartridge - Up to 3,500* pages
TN-570/TN-3060: High yield toner cartridge - Up to 6,700* pages
*(when printing letter size or A4 paper at 5% print coverage)

NOTE:
Toner life expectancy will vary depending upon the type of average print job.

Drum Unit Life Expectancy
Up to 20,000 pages

NOTE:
There are many factors that determine the actual drum life, such as temperature, humidity, type of paper, toner you use and number of pages per print job.

2.10 Network

Interface	10/100 Base TX Ethernet (automatic)
Protocol	TCP/IP (RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS, SSDP, Rendezvous, LPR/LPD, Port9100, POP3/SMTP, SMB, IPP, FTP, TELNET, SNMP, HTTP, TFTP), Netware IPX/SPX (Bindery and NDS), Apple Talk, DLC/LLC
Control	Web Based Management (HTTPD) BRAdmin Professional (TCP/IP or IPX/SPX is used) SNMP, Brother's original MIB in compliance with MIBII TELNET command console Web BRAdmin
Update of Programs	Flash ROM base Upgrade using TFTP/FTP protocols is available. Upgrade using IPX/SPX protocols is available. Upgrade using the Brother BRAdmin utility is available.
Supplied Software	BRAdmin Professional (when using Windows® 95/98/Me, Windows® NT 4.0/ Windows® 2000/XP) Port drivers supporting Windows® 95/98/Me, Windows® NT 4.0/ Windows® 2000 LRP port drivers (when using Windows® 95/98/Me, Windows® NT 4.0) NetBIOS port drivers (when using Windows® 95/98/Me, Windows® NT 4.0/ Windows® 2000/XP) SMTP port driver (when using Windows® 95/98/Me, Windows® NT 4.0/ Windows® 2000/XP) Web BRAdmin Professional (Not included in the CD-ROM. Uploaded to the Web site.) For more information on Web BRAdmin Professional, please access http://solutions.brother.co.jp.

2.11 Paper

2.11.1 Feedable paper

(1) Type

Type	Paper tray (Tray #1)	Manual feed tray	Lower tray (Tray #2)	Selection from printer driver
Plain paper 60 to 105 g/m^2 (16 to 28lb)	O	O	O	Plain paper or rather thick plain paper
Recycled paper	O	O	O	Plain paper or rather thick plain paper
Bond paper		O		Bond paper
Thick paper 105g/m^2 to 161g/m^2 (28 to 43lb)		O		Thick paper (Post card) or extra thick paper
Transparency	O up to 10 sheets	O A4 or Letter		OHP
Labels		O A4 or Letter		Plain paper or rather thick plain paper
Envelope		O		Envelope, thick envelope, thin envelope
Post card		O		Thick paper (Post card) or extra thick paper

(2) Size

	Paper tray (Tray #1)	Manual feed tray	Lower tray (Tray #2)
Size	A4, Letter, JIS B5, ISO B5, ISO B6, A5, A6, Legal, Executive	Horizontal: 69.8 to 220.0mm Vertical: 116.0 to 406.0mm	A4, Letter, JIS B5, ISO B5, ISO B6, A5, Legal, Executive

(3) Other specifications

<In the case of Paper Tray>

	Plain paper (Recycled paper)
Weight	60 to 105 g/m^2
Thickness	0.08 to 0.13 mm
Moisture content	4 to 6% of weight

<In the case of Manual Feed Tray>

	Plain paper	Envelope
Weight	60 to 161g/m^2	75 to 90g/m^2 equivalent to one sheet
Thickness	0.08 to 0.2mm	0.084 to 0.12mm equivalent to one sheet
Moisture content	4 to 6% of weight	4 to 6% of weight

(4) Recommended paper

Plain Paper Plain paper: Xerox 4200 20lb
Hammermill Laser Paper 24lb

Transparency 3M CG 3300

Labels Avery laser label # 5160

CAUTION:

When you are choosing print media, be sure to follow the information given below to prevent any paper jams, print quality problems or machine damage;

- *It is recommended to use long-grained paper for the best print quality. If short-grained paper is being used, it might be the cause of paper jams.*
- *Use neutral paper. Do not use acid paper to avoid any damage to the drum unit.*
- *Avoid using coated paper such as vinyl coated paper.*
- *Avoid using preprinted or highly textured paper.*
- *It is recommended to use labels or transparencies which are designed for use in laser printers.*
- *Avoid feeding labels with the carrier sheet exposed, or the machine will be damaged.*
- *Before loading paper with holes such as organizer sheets, be sure to fan the stack well.*
- *Do not use organizer sheets that are stuck together. The glue that is used might caused damaged to the machine.*
- *When printing on the back of pre-printed paper, if the paper is curled, be sure to straighten the paper as much as possible.*
- *Different types of paper should not be loaded at the same time in the paper tray to avoid any paper jams or misfeeds.*

2.11.2 Paper capacity

	Paper tray (Tray #1)	Manual feed tray	Lower tray (Tray #2)
Paper capacity	250 sheets (80g/m^2)	1 sheet	250 sheets (80g/m^2)

2.11.3 Paper output

(1) Face-down output tray

Output capacity: Max. 150 sheets (80g/m^2)
Only in the case of face-down output

(2) Face-up output tray

Output capacity: Max. 1 sheet (80g/m^2)
Only in the case of face-up output

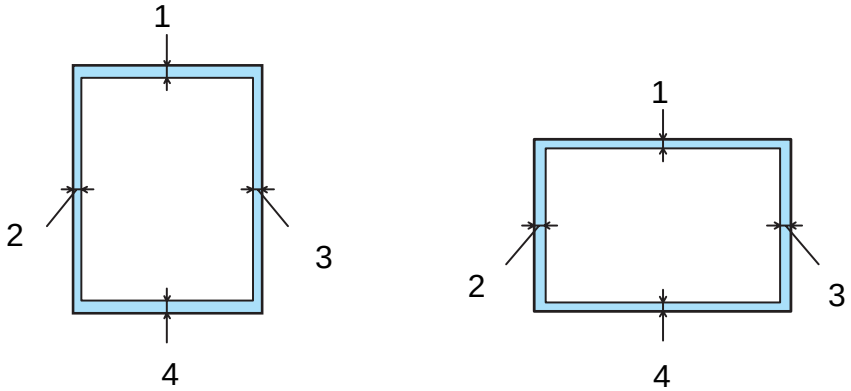
Hint:
Face-down output: Output paper with its printed surface turned down
Face-up output: Output paper with its printed surface turned up

(3) The output methods according to paper types as shown below are recommended.

Paper types	Paper output	
	Face-down output	Face-up output
Plain paper	O	O
Thick paper		O
Recycled paper	O	O
Transparency	O	
Label		O
Envelope		O
Post card		O

2.12 Printable Area

Unprintable areas (edge) of recording paper by size are shown below. Areas excluding the edge measurement from recording paper size are printable areas.



	A4, Letter, B5, A5, A6, Post card
1	4.2mm (50 dots with the 300dpi mode)
2	4.2mm (50 dots with the 300dpi mode)
3	4.2mm (50 dots with the 300dpi mode)
4	4.2mm (50 dots with the 300dpi mode)

2.13 Print Speeds with Various Settings

Print speed of the machine is up to 18cpm when loading A4 size paper from the paper tray in the plain paper mode.
Actual print speed varies depending on the paper type or paper size as shown in the tables below;

< Letter or A4 size >

Mode setting	Print speed
OHP	21cpm (Letter), 20cpm (A4)
Plain paper	21cpm (Letter), 20cpm (A4)
Rather thick plain paper/Thin envelope	21cpm (Letter), 20cpm (A4)
Thick paper (Post card)/Envelope	21cpm (Letter), 20cpm (A4)
Extra thick paper/Bond paper/ Rather thick envelope	4cpm *

< Smaller size than Letter or A4 >

Mode setting	Print speed
OHP	21cpm (Letter), 20cpm (A4)
Plain paper	21cpm (Letter), 20cpm (A4)
Rather thick plain paper/Thin envelope	8cpm after 5 min. have passed.
Thick paper (Post card)/Envelope	8cpm after 30 sec. have passed.
Extra thick paper/Bond paper/ Rather thick envelope	4cpm *

**The print speed may vary according to conditions, such as paper size and paper tray.*

NOTE:

- *When a smaller size paper than A4 size is printed, the temperature on both edges of the fixing unit is much higher than the temperature on the center of the unit where the paper is fed depending on the setting or model. Therefore, the print speed is slowed in order to decrease the temperature on the edges after the specified time, it is maximum print speed when you first start printing.*
- *Max. speed is 20 cpm or more. It varies depending on the paper size.*

2.14 Toner Cartridge Weight Information

Toner cartridge weight (approx weight)

	TN3060/TN570	TN3030/TN540
Brand new toner cartridge weight	827.5g	772.5g
Toner weight at brand new toner cartridge	197.5±2.5g	142.5±2.5g
Toner cartridge weight at toner near empty	693.5 to 698.5g	693.5 to 698.5g
Remain toner weight at toner near empty	80 to 85g	80 to 85g
Toner cartridge weight at toner empty	678.5 to 683.5g	678.5 to 683.5g
Remain toner weight at toner empty	65 to 70g	65 to 70g
You can print 500 to 600 pages with 10g toner.		

*Without yellow protector

*Toner cartridge weight may vary within 2 to 3g depending on the cartridge weight.

3. SERIAL NO. DESCRIPTIONS

The descriptions below show how to understand the meanings of the numbers printed on the labels or bag of the machine and machine parts:

< ID for production month >

A:	January	B:	February	C:	March	D:	April
E:	May	F:	June	G:	July	H:	August
J:	September	K:	October	L:	November	M:	December

< ID for year >

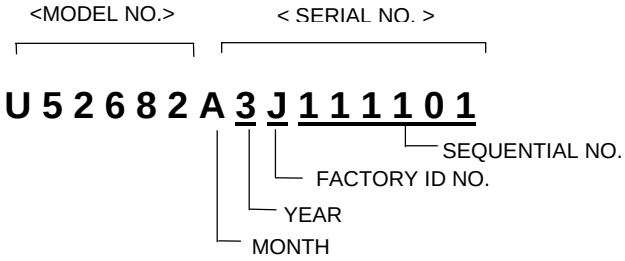
3: 2003 4: 2004

< ID for factory >

9: Kariya Plant A: Mie Brother C: BIUK
J: Buji Nan Ling Factory

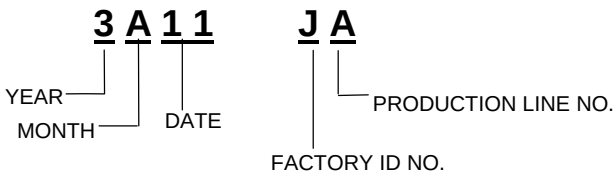
(1) Machine: Printed on the label attached on the rear of the main body

<Example>

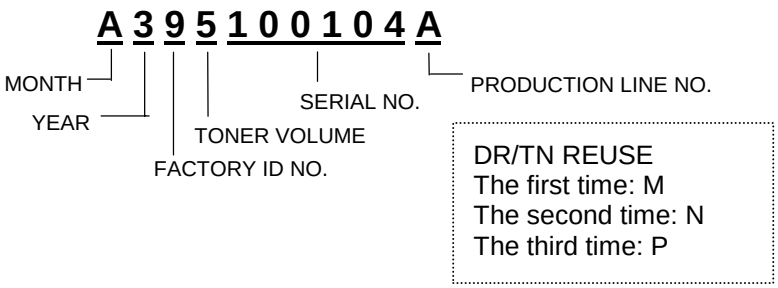


(2) Process unit: Imprinted on the aluminum bag

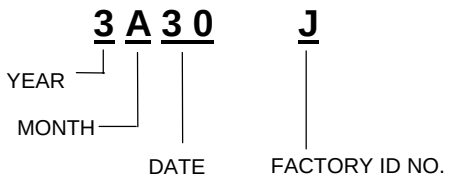
(Drum unit with toner cartridge)



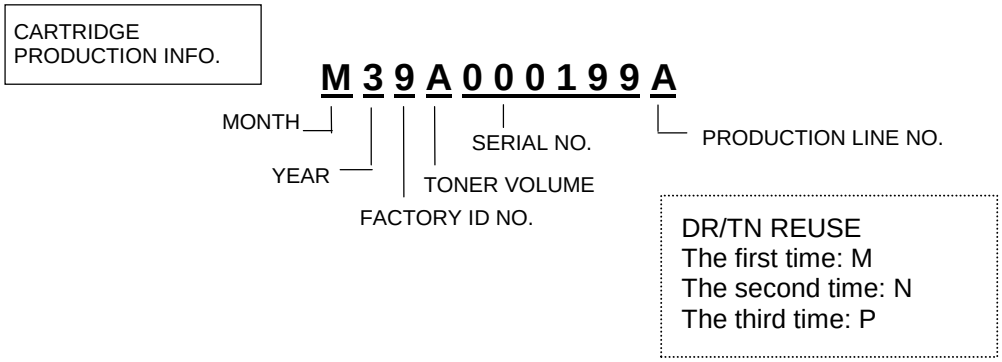
(3) Drum unit: Printed on the bar code label attached inside the drum unit



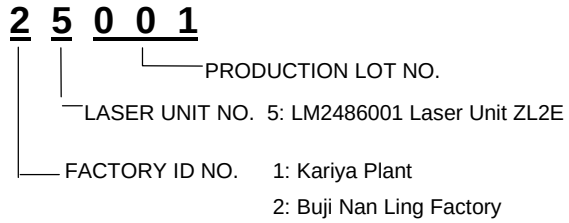
(4) Toner cartridge: Imprinted on the aluminum bag



Printed on the bar code label attached on the toner cartridge



(5) Laser unit: On the laser unit



CHAPTER 2 INSTALLATION AND BASIC OPERATION

1. CONDITIONS REQUIRED FOR INSTALLATION

1.1 Power Supply

- The source voltage must stay within ±10% of the rated voltage shown on the rating plate.
- The power cord, including extensions, should not exceed 5 meters (16.5 feet).
- Do no share the same power circuit with other high-power appliances, particularly an air conditioner, copier or shredder. If it is unavoidable that you must use the machine with these appliances, it is recommended that you use an isolation transformer or a high-frequency noise filter.
- Use a voltage regulator if the power source is not stable.

1.2 Environment

- The machine should be installed near a power outlet, which is easily accessible.
- The room temperature is maintained between 10°C and 32.5°C. The relative humidity is maintained between 20% and 80%.
- The machine should be used in a well ventilated room.
- Place the machine on a flat, horizontal surface.
- Keep the machine clean. Do not place the machine in a dusty place.
- Do not place the machine where the ventilation hole of the machine is blocked. Keep approximately 100 mm (4 inches) between the ventilation hole and the wall.
- Do not place the machine where it is exposed to direct sunlight. Use a blind or a heavy curtain to protect the machine from direct sunlight when the machine is unavoidably set up near a window.
- Do not place the machine near devices that contain magnets or generate magnetic fields.
- Do not subject the machine to strong physical shocks or vibrations.
- Do not expose the machine to open flames or salty or corrosive gasses.
- Do not place objects on top of the machine.
- Do not place the machine near an air conditioner.
- Keep the machine horizontal when carrying.
- Do not cover the slots in the side cover.

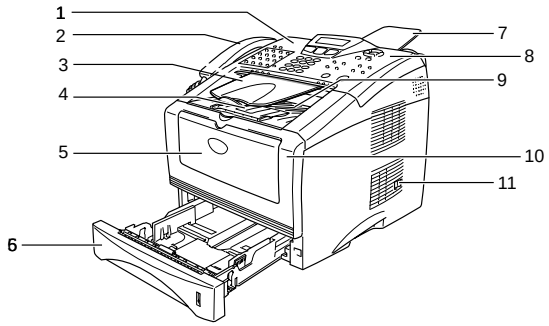
1.3 System Requirements for Brother Printer Solution

Check the following system requirements to setup and operate the printer using Brother Printing Solution:

Computing System Operating System Version		Processor Speed	Minimum RAM	Recommended RAM	Available Hard Disk Space
Windows® Operating System	95, 98, 98SE	488/66 MHz	8MB	16MB	40MB
	NT Workstation 4.0	Pentium 75MHz	16MB	32MB	50MB
	2000 Professional	Pentium 133MHz	64MB	128MB	50MB
	Me	Pentium 150MHz	32MB	64MB	50MB
	XP	Pentium 300MHz	128MB	128MB	50MB
Apple Macintosh Operating System	OS 8.6 to 9.2	All base models meet minimum system requirements	32MB	64MB	50MB
	OS X 10.1 to 10.2.1		128MB	160MB	

2. UNPACKING

When unpacking the machine, check to see that all of the following components are included in the carton.

<table>
<tr><td colspan="2">MFC
 

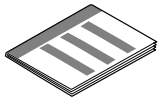
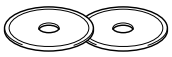
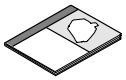
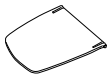
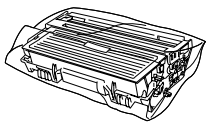
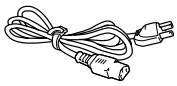
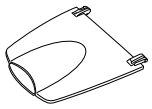
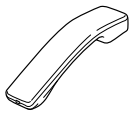
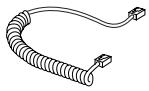
1. Control Panel
2. Telephone Handset
3. ADF Document Output Support
4. Face-down Output Tray Support Flap with Extension (Support Flap)
5. Manual Feed Tray
6. Paper Tray
7. ADF Document Support
8. Control Panel Cover
9. Face-down Output Tray
10. Front Cover
11.Power Switch</td><td> 
Quick Setup Guide</td></tr>
<tr><td colspan="2"></td><td> 
CD-ROMs
For Windows®
For Macintosh®</td></tr>
<tr><td colspan="2"></td><td> 
User's Guide</td></tr>
<tr><td> 
ADF Document Support</td><td> 
Drum Unit Assembly
(including Toner Cartridge)</td><td> 
Power Cord</td></tr>
<tr><td> 
ADF Document Output Support</td><td> 
Telephone Handset
(U.S.A. / Canada only)</td><td> 
Handset Curled Cord
(U.S.A. / Canada only)</td></tr>
<tr><td>
Telephone Line Cord</td><td>
Test Sheet (U.S.A. only)</td><td>
Accessory Order Form
(U.S.A. / Canada only)</td></tr>
</table>

Fig. 2-1

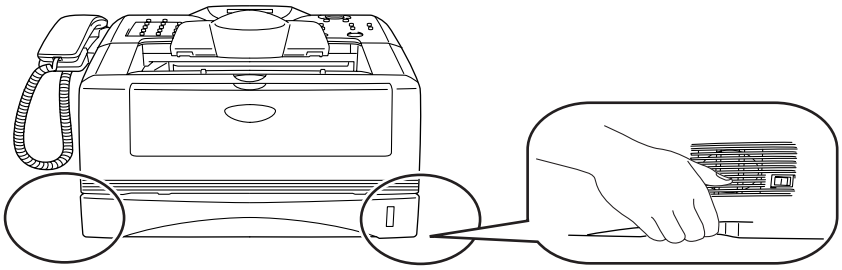
Carton components may differ from one country to another.
Save all packing materials and the carton.

NOTE:

- *The interface cable is not a standard accessory. Please purchase the appropriate interface cable for the interface you intend to use (Parallel or USB).*
- *For Parallel use a bi-directional shield interface cable that is IEEE 1284-compliant, and not longer than 6 feet (2 meters).*
- *For USB: use a Hi-Speed USB 2.0 interface cable that is not longer than 6 feet (2 meters).*
- *Please make sure that you use a Hi-Speed USB 2.0 certified cable if your computer uses a Hi-Speed USB 2.0 interface.*
- *Even if your computer has a USB 1.1 interface, you can connect the machine.*

CAUTION:

When you move the machine, grasp the side handholds that are at the bottom shown in the illustration.



3. INSTALL THE MACHINE

You need to implement hardware setup and driver installation to use the machine.

Firstly, identify the Operating System on your computer. (Windows® 95/98/Me, Windows® NT 4.0/ Windows® 2000/XP and Macintosh) Then, purchase the appropriate interface cable (Parallel, USB or Network) for your computer. Most existing parallel cables support bi-directional communication, but some might have an incompatible pin assignment or may not be IEEE 1284-compliant.

The installation programs for the hardware setup and driver installation are contained on the supplied CD-ROM.

3.1 For All Users

For Windows® users

(1) Turn on the PC power. Insert the supplied CD-ROM into the CD-ROM drive. The opening screen will appear automatically. Follow the on-screen instructions.

NOTE:

*If the opening screen does not appear; click **Start** and select **Run**. Then, enter the CD-drive letter and type \START.EXE (for example: D:\START.EXE).*

(2) Click the **Initial Setup** icon on the menu screen.

(3) You can view the Initial Setup instructions.

For Macintosh® users

(1) Turn on the Macintosh. Insert the CD-ROM into the CD-ROM drive.

(2) Double click the **Start Here!** icon or **Start Here OS X** icon. Follow the on-screen instructions.

(3) Click the **Initial Setup** icon on the menu screen.

(4) You can view the Initial Setup instructions.

3.1.1 Attaching the Supports

NOTE:

Do not connect the interface cable. Connecting the interface cable is done when installing the driver.

(1) Attach the ADF document support.

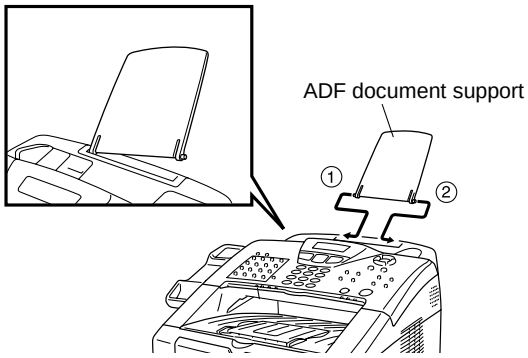


Fig. 2-2

(2) Open the control panel cover by lifting it toward the back.

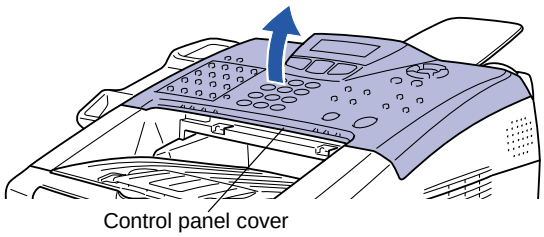


Fig. 2-3

(3) Attach the ADF support.

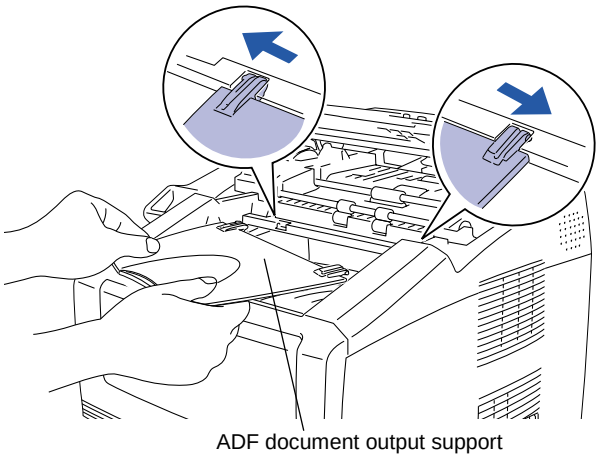


Fig. 2-4

(4) Close the control panel cover.

3.1.2 Installing the Handset

(1) Connect the curled handset cord to the machine and the other end to the handset. (U.S.A. / Canada only)

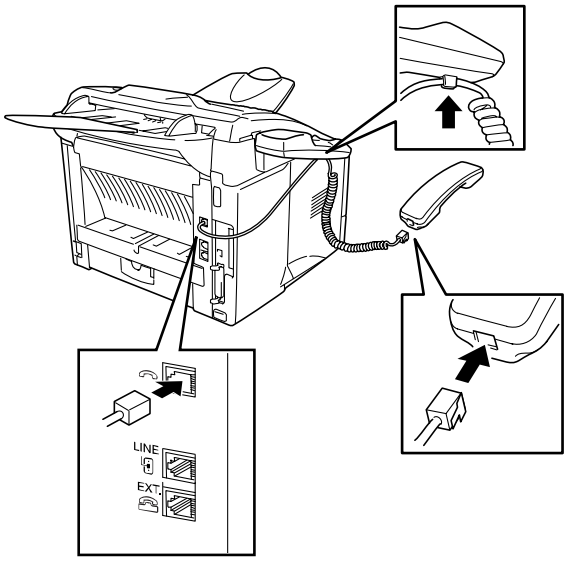


Fig. 2-5

3.1.3 Installing the Drum Unit Assembly

(1) Open the front cover by pressing the front cover release button.

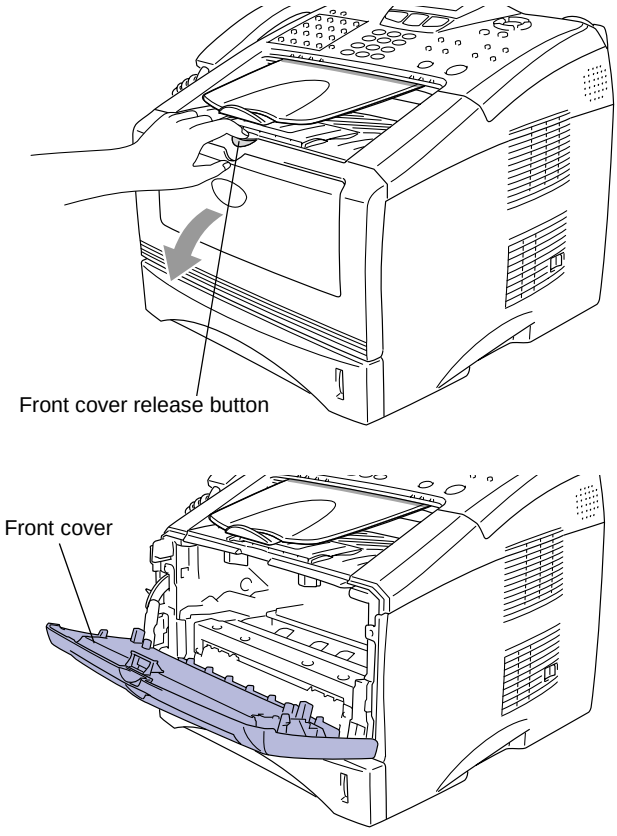


Fig. 2-6

(2) Unpack the drum unit assembly. Remove the protective part.

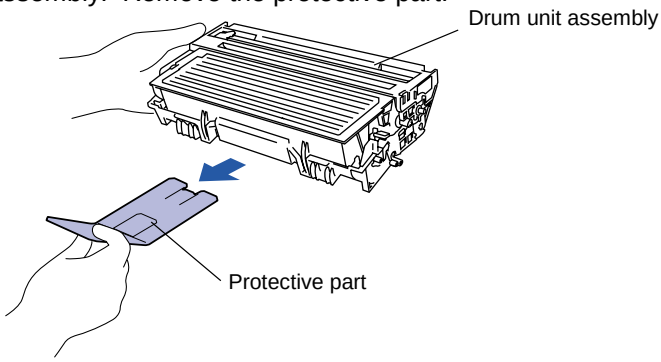


Fig. 2-7

(3) Rock it from side to side several times to distribute the toner evenly inside the assembly.

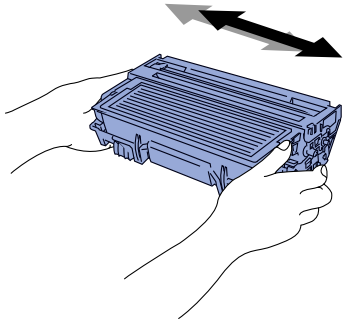


Fig. 2-8

(4) Push the drum unit assembly into the machine (until it snaps into place).

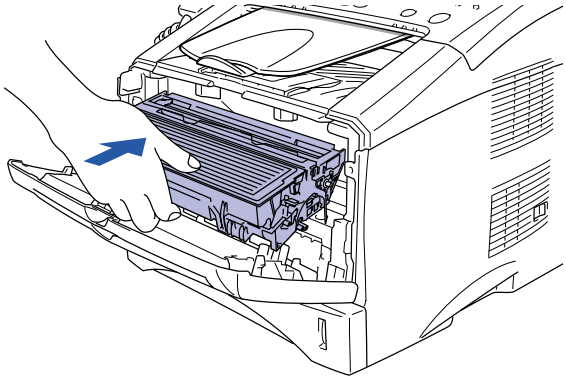


Fig. 2-9

(5) Close the front cover of the machine.

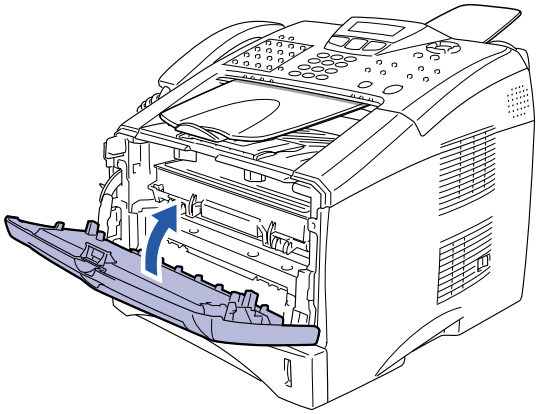


Fig. 2-10

3.1.4 Load Paper in the Paper Tray

(1) Pull the paper tray completely out of the machine.

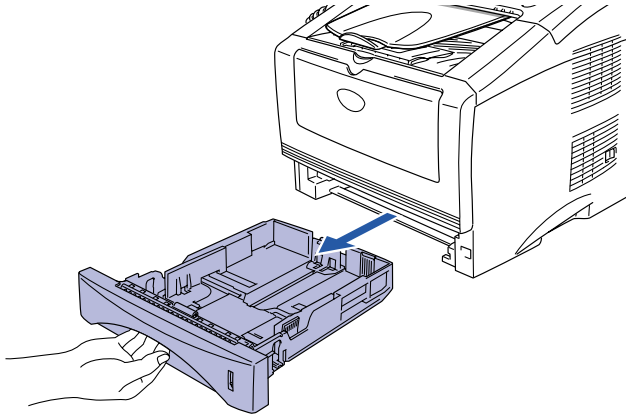


Fig. 2-11

(2) While pressing the paper guide release lever, slide the adjusters to fit the paper size. Check that the guides are firmly in the slots on the tray.

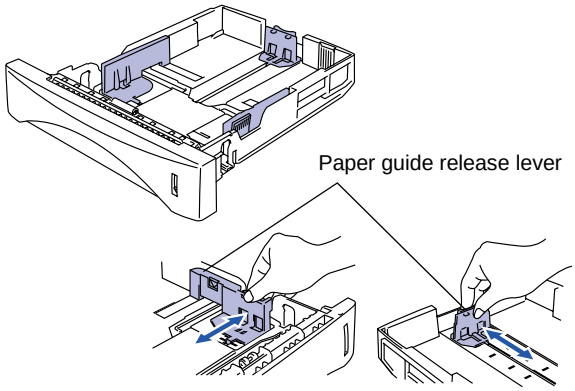


Fig. 2-12

NOTE:

For Legal size paper, press the universal guide release button and pull out the rear of the paper tray.

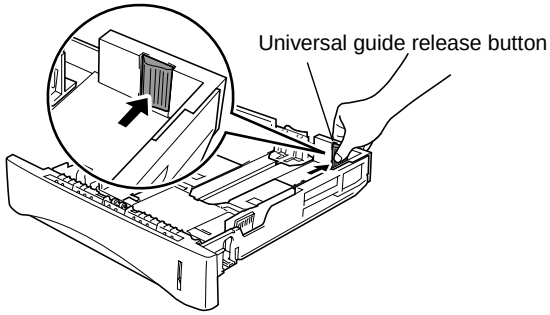


Fig. 2-13

(3) Fan the stack of paper well to avoid paper jams and misfeeds.

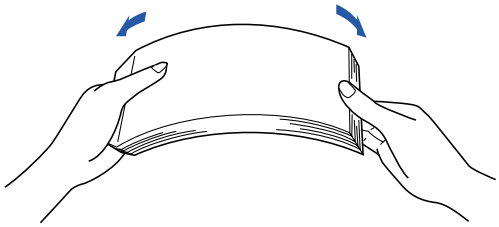


Fig. 2-14

(4) Put paper in the paper tray. Check that the paper is flat in the tray and below the maximum paper mark.

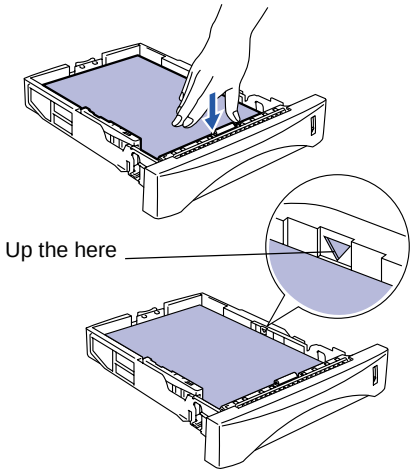


Fig. 2-15

(5) Put the paper tray firmly back in the machine and unfold the support flap before you use the machine.

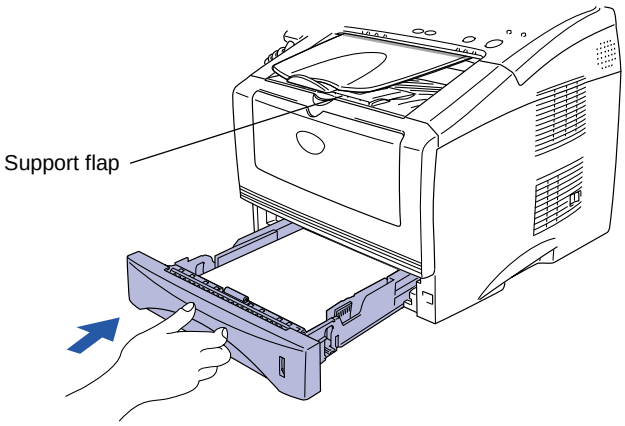


Fig. 2-16

NOTE:

For details on supported paper specifications, see "About paper" in Chapter 2 of the User's Guide.

3.1.5 Installing the Power Cord and Phone Line

NOTE:
Do not connect the Parallel or USB cable yet.

(1) Make sure that the power switch is off. Connect the power cord to the machine.

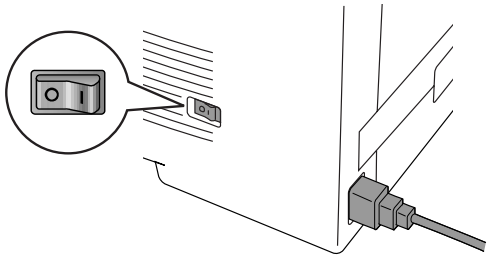


Fig. 2-17

(2) Plug the power cord into an AC outlet. Turn the power switch on.

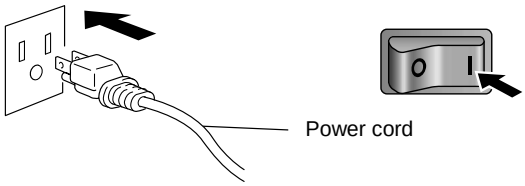


Fig. 2-18

(3) Connect one end of the telephone line cord to the jack on the machine marked **LINE** and the other end to a modular wall jack.

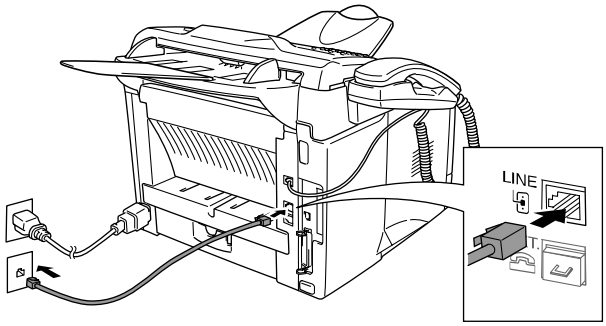


Fig. 2-19

* MJ cover is only equipped for Europe spec.

⚠ WARNING

- *The machine must be grounded using a 3-prong plug.*
- *Since the machine is grounded through the power outlet, you can protect yourself from potentially hazardous electrical conditions on the telephone network by keeping the power to your machine on when you connect it to a telephone line. Similarly, you can protect yourself when you want to move your machine by disconnecting the telephone line first and then the power cord.*

NOTE:

If you are sharing one phone line with an external telephone, connect it as shown below.

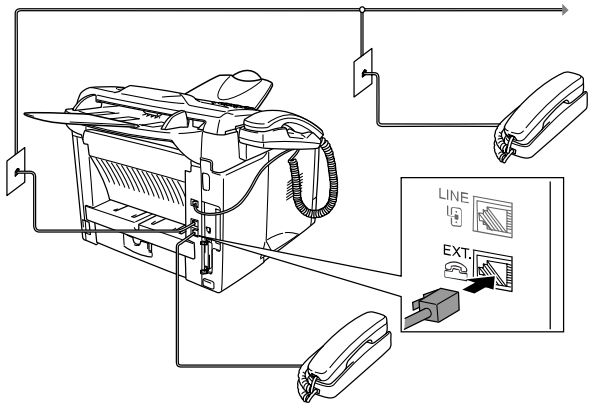


Fig. 2-20

NOTE:

- If you are sharing one phone line with an external telephone answering device, connect it as shown below.

- Please set the receive mode to External TAD.

- For more details, see "Connecting the MFC" in Chapter 1 of the User's Guide.

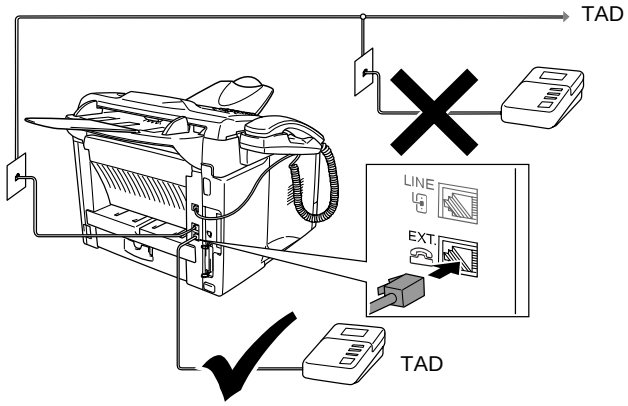


Fig. 2-21

3.2 Installing the Driver & Software

3.2.1 For USB Interface Cable Users (For Windows® 98/98SE/Me/2000 Professional/XP)

(1) Switch off and unplug the machine from the AC outlet and disconnect it from your computer, if you already connected an interface cable.

(2) Turn on your computer.
(For Windows® 2000 Professional/XP, you must be logged on as the administrator.)

(3) Insert the supplied CD-ROM for Windows® into your CD-ROM drive. If the model name screen appears, select your machine. If the language screen appears, select your language.

(4) The CD-ROM main menu will appear.
Click **Install Software**.

NOTE:
*If this window does not appear, use Windows® Explore to run the **setup.exe** program from the root directory of the Brother CD-ROM.*

(5) Click **MFL-Pro Suite** in Main Application.

NOTE:
- *MFL-Pro Suite includes Printer Driver, Scanner Driver, ScanSoft® PaperPort ®, ScanSoft® Text Bridge®, PC-FAX software, Remote Setup and True Type fonts.*
- *PaperPort® is a document management application for viewing scanned documents.*
- *ScanSoft® TextBridge®, which is integrated into PaperPort®, is an OCR application that converts an image into text and inserts it into your default word processor.*

(6) Click **Install**.

NOTE:
- *If you see the following screen, click **OK** to install the Windows ®updates. After the updates are installed your PC may restart.*
- *If it does the installation will automatically continue.*
- *If the installation does not continue automatically, please open the installer menu again by double-clicking the **setup.exe** program from the root directory of the Brother CD-ROM, and continue from Step (4).*

(7) When the **PaperPort 8.0 SE Setup** window is displayed, click **Next**.

(8) After reading and accepting the ScanSoft® License Agreement, enter your user information and click **Next**.

(9) Select **Typical** and click **Next**.

(10) Click **Install** and PaperPort® will start installing on your computer.

(11) When the **PaperPort 8.0 SE Registration** screen is displayed, make your selection and follow the on-screen instructions.

(12) Click **Finish** to complete installation.

(13) When the **Brother MFL-Pro Suite Installation** window appears, click **Next**.

NOTE:
- *If an error message appears at this point in the installation process, or if you have previously installed the MFL-Pro Suite, you will first have to uninstall it.*
- *From the **Start** menu, select **Programs, Brothe**r, **Brother MFL-Pro Suite**, **Uninstall**, and then follow the instructions on the screen.*

(14) When the Brother Software License Agreement window appears, click **Yes**.

(15) Select **Local Interface**, and then click **Next**.

(16) Select **Standard**, and then click **Next**. The application files will be copied and installed to your computer.

NOTE:

- *If you want to install the PS Brother (PostScript®) driver, select **Custom** and then follow the on-screen instructions.*
- *When the **Select Components** screen appears, check **PS Printer Drive**r, and then continue following the on-screen instructions.*

< For Windows® 98/98SE/Me Users Only >

Make sure that you followed the instructions in (1) to (16) on pages 2-13 to 2-14.

(17) When this screen appears, connect the USB interface cable to your PC, and then connect it to the machine.

Plug the machine into the AC power outlet. Turn the power switch on.

It will take a few seconds for the installation screen to appear.

The installation of the Brother drivers will automatically start. Follow the instructions on the screen.

(18) Select **BRUSB: USB Printer Port**, and then click **Next**.

(19) Accept the default Printer name by selecting **Yes**, and then click **Next**.

(20) Select **Yes (recommended**), and then click **Finish**. A test page will be printed so you can check the print quality.

(21) If the test page is printed correctly, click **Yes**. If you click **No**, follow the prompts on the screen to correct the problem.

NOTE:

*If the README file shown in step (22) appears, close the README.WRI file and then click **Finish** after printing the page.*

(22) The README file will be displayed. Please read this file for troubleshooting information and then close the file to continue installation.

(23) Check the **Run On-Line Registration** and then click **Nex**t.

(24) Click **Finish** to restart your computer.

(25) After the computer restarts, click **Yes** to have the Control Center load each time Windows® is started. The Control Center will appear as an icon in the task tray.

If you click **No** the Scan key on the machine will be disabled.

NOTE:

*Even if you select **NO**, you will be able to launch the Brother Control Center later to use the Scan key by double-clicking the Smart UI icon on the desktop. This loads the Brother Control Center to the task tray. See AutoLoad the Brother Control Center, Chapter 4 in the Documentation (Software User's Guide) located on the CD-ROM.*

OK:

The Brother PC-FAX, Printer and Scanner drivers have been installed and the installation is now complete.

< For Windows® 2000 Professional Users Only >

Make sure that you followed the instructions in (1) to (16) on pages 2-13 to 2-14.

(17) When this screen appears, connect the USB interface cable to your PC, and then connect it to the machine.
Plug the machine into the AC power outlet. Turn the power switch on.
It will take a few seconds for the installation screen to appear.
The installation of the Brother drivers will automatically start. Follow the instructions on the screen.

(18) If the **Digital Signature Not Found** dialog boxes appear, click **Yes** to install the driver.

(19) The README file will be displayed.
Please read this file for troubleshooting information and then close the file to continue installation.

(20) Check the **Run On-Line Registration** and then click **Next**.

(21) Click **Finish** to restart your computer.

(22) After the computer restarts, click **Yes** to have the Control Center load each time Windows® is started. The Control Center will appear as an icon in the task tray.
If you click **No** the Scan keys on the machine will be disabled.

NOTE:

*Even if you select **NO**, you will be able to launch the Brother Control Center later to use the Scan key by double-clicking the Smart UI icon on the desktop. This loads the Brother Control Center to the task tray. See AutoLoad the Brother Control Center, Chapter 4 in the Documentation (Software User's Guide) located on the CD-ROM.*

OK:

A Basic Universal printer driver was installed with the MFL-PRO Software Suite which is certified for use with Windows® operating systems.

Brother also offers a fully featured printer driver (Native driver) that includes more features than the Basic Universal driver. However, this driver does not include a Windows® certificate. To install the Brother Native driver proceed to step (23).

NOTE:

For details on what features are available, see chapter 2 of the Software User's Guide.

Brother Native driver Installation

(23) Click **Start** and select **Settings** and then **Printers**. Click on **Add Printer** and the Add Printer Wizard will start.
When this screen appears, click **Next**.

(24) Un-check the **Automatically detect and install my Plug and Play printer** selection and then click **Next**.

(25) Select **USBXXX** from the pull down window for the Printer Port Selection and then click **Next**.

(26) Click on **Have Disk**.

(27) Browse the CD-ROM and highlight your language folder and click **Open**.
Highlight the **W2K** folder and click **Open**.
Highlight the **Addprt** folder and click **Open**.

(28) Click **Open**.

(29) Make sure **X: \ENG\W2K\Addprt** is displayed in the window and click **OK** (X:\ is the drive letter of your CD-ROM).

(30) Highlight the model you are installing from the list of machines and click **Next**.

NOTE:

Make sure you select a USB printer.

(31) The model you are installing will be listed in the window. Select **Yes** or **No** if you want this driver to be your default printer and then click **Next**.

(32) If this screen appears, select **Do not share this printer** and **Next**.

(33) Select **Yes** and **Next** to print a test page.

(34) When this screen appears, click **Finish**.

(35) If the **Digital Signature Not Found** dialog box appears, click **Yes**.

(36) If the test page printed, click **OK**.

NOTE:

- *There will be two Brother printer drivers listed in the Printers selection.*
- *The driver with "Printer" after the model name (ex. Brother MFC-8220 Printer) is the Brother Native Driver.*

OK:

The Brother Native Drivers have been installed and the installation is now complete.

< For Windows® XP Users Only >

Make sure that you followed the instructions in (1) to (16) on pages 2-13 to 2-14.

(17) When this screen appears, connect the USB interface cable to your PC, and then connect it to the machine.

Plug the machine into the AC power outlet. Turn the power switch on.

It will take a few seconds for the installation screen to appear.

The installation of the Brother drivers will automatically start. The screen appears one after another, please wait for a while.

(18) The README file will be displayed.

Please read this file for troubleshooting information and then close the file to continue installation.

(19) Check the **Run On-Line Registration** and then click **Next**.

(20) Click **Finish** to restart your computer.

OK:

A Basic Universal printer driver was installed with the MFL-PRO Software Suite which is certified for use with Windows® operating systems.

Brother also offers a fully featured printer driver (Native driver) that includes more features than the Basic Universal driver. However, this driver does not include a Windows® certificate. To install the Brother Native driver proceed to step (21).

NOTE:

For details on what features are available, see chapter 2 of the Software User's Guide.

Brother Native driver Installation

(21) Click **Start** and select **Printers and Faxes**.
Click on **Add a printer** and the Add Printer Wizard will start.
When this screen appears, click **Next**.

(22) Un-check the **Automatically detect and install my Plug and Play printer** selection and then click **Next**.

(23) Select **USBXXX** from the pull down window for the Printer Port Selection and then click **Next**.

(24) Click on **Have Disk**.

(25) Browse the CD-ROM and highlight your language folder and click **Open**.
Highlight the **WXP** folder and click **Open**.
Highlight the **Addprt** folder and click **Open**.

(26) Click **Open**.

(27) Make sure **X: \ENG\W2K\Addprt** is displayed in the window and click **OK** (X:\ is the drive letter of your CD-ROM).

(28) Highlight the model you are installing from the list of machines and click **Next**.

NOTE:
Make sure you select a USB printer.

(29) The model you are installing will be listed in the window. Select **Yes** or **No** if you want this driver to be your default printer and then click **Next**.

(30) If this screen appears, select **Do not share this printer** and **Next**.

(31) Select **Yes** and **Next** to print a test page.

(32) When this screen appears, click **Finish**.

(33) When this screen appears, click **Continue Anyway**.

NOTE:

- *There will be two Brother printer drivers listed in the "Printers" selection.*
- *The driver with Printer after the model name (ex. Brother MFC-8220 Printer) is the Brother Native Driver.*

OK:
The Brother Native Drivers have been installed and the installation is now complete.

3.2.2 For Parallel Interface Cable Users (For Windows® 95/98/98SE/Me/2000 Professional/XP)

(1) Switch off and unplug the machine from the AC outlet and disconnect it from your computer, if you already connected an interface cable.

(2) Turn on your computer.
(For Windows® 2000 Professional/XP, you must be logged on as the administrator.)

(3) Insert the supplied CD-ROM for Windows® into your CD-ROM drive. If the model name screen appears, select your machine. If the language screen appears, select your language.

(4) The CD-ROM main menu will appear.
Click **Install Software**.

NOTE:

*If this window does not appear, use Windows® Explore to run the **setup.exe** program from the root directory of the Brother CD-ROM.*

(5) Click **MFL-Pro Suite** in Main Application.

NOTE:

- *MFL-Pro Suite includes Printer Driver, Scanner Driver, ScanSoft® PaperPort®, ScanSoft® Text Bridge®, PC-FAX software, Remote Setup and True Type fonts. PaperPort® is a document management application for viewing scanned documents.*
- *ScanSoft® TextBridge®, which is integrated into PaperPort ®, is an OCR application that converts an image into text and inserts it into your default word processor.*

(6) Click **Install**.

NOTE:

- *If you see the following screen, click **OK** to install the Windows ®updates. After the updates are installed your PC may restart.*
- *If it does the installation will automatically continue.*
- *If the installation does not continue automatically, please open the installer menu again by double-clicking the **setup.exe** program from the root directory of the Brother CD-ROM, and continue from step (4).*

(7) When the **PaperPort 8.0 SE Setup** window is displayed, click **Next**.

(8) After reading and accepting the ScanSoft® License Agreement, enter your user information and click **Next**.

(9) Select Typical and click **Next**.

(10) Click **Install** and PaperPort ® will start installing on your computer.

(11) When the **PaperPort 8.0 SE Registration** screen is displayed, make your selection and follow the on- screen instructions.

(12) Click **Finish** to complete installation.

(13) When the **Brother MFL-Pro Suite Installation** window appears, click **Next**.

NOTE:

*If an error message appears at this point in the installation process, or if you have previously installed the MFL-Pro Suite, you will first have to uninstall it. From the **Start** menu, select **Programs, Brothe**r, **Brother MFL-Pro Suite**, **Uninstall**, and then follow the instructions on the screen.*

(14) When the Brother Software License Agreement window appears, click **Yes**.

(15) Select **Local Interface**, and then click **Next**.

(16) Select **Standard**, and then click **Next**. The application files will be copied to your computer.

NOTE:

*If you want to install the PS Brother (PostScript®) driver, select **Custom** and then follow the on-screen instructions. When the **Select Components** screen appears, check **PS Printer Drive**r, and then continue following the on-screen instructions.*

< For Windows® 95/98/98SE/Me Users Only >

Make sure that you followed the instructions in (1) to (16) on pages 2-18 to 2-19.

(17) When this screen appears, connect the parallel interface cable to your PC, and then connect it to the machine.

Plug the machine into the AC power outlet. Turn the power switch on.

Caution

Do not plug the power cord before connecting the parallel interface cable. It may cause damage to your machine.

(18) Click **Next**.

(19) The README file will be displayed.

Please read this file for troubleshooting information and then close the file to continue installation.

(20) Check the **Run On-Line Registration** and then click **Next**.

(21) Click **Finish** to restart your computer.

(22) After the computer restarts, the installation of the Brother drivers will automatically start.

Follow the instructions on the screen.

(23) Click **Yes** to have the Brother MFL-Pro Control Center load each time Windows® is started. The Control Center will appear as an icon in the task tray.

If you click **No** the Scan key on the machine will be disabled.

NOTE:

*Even if you select **NO**, you will be able to launch the Brother Control Center later to use the Scan key by double-clicking the Smart UI icon on the desktop. This loads the Brother Control Center to the task tray. See AutoLoad the Brother Control Center, Chapter 4 in the Documentation (Software User's Guide) located on the CD-ROM.*

OK:

The Brother PC-FAX, Printer and Scanner drivers have been installed and the installation is now complete.

< For Windows® 2000 Professional Users Only >

Make sure that you followed the instructions in (1) to (16) on pages 2-18 to 2-19.

(17) When this screen appears, connect the parallel interface cable to your PC, and then connect it to the machine.

Plug the machine into the AC power outlet. Turn the power switch on.

Caution

Do not plug the power cord before connecting the parallel interface cable. It may cause damage to your machine.

(18) Click the **Next**.

(19) The README file will be displayed.

Please read this file for troubleshooting information and then close the file to continue installation.

(20) Check the **Run On-Line Registration** and then click **Next**.

(21) Click **Finish** to restart your computer.

(22) After the computer restarts, the installation of the Brother drivers will automatically start.

Follow the instructions on the screen.

(23) If the **Digital Signature Not Found** dialog boxes appear, click **Yes** to install the driver.

(24) Click **Yes** to have the Control Center loaded each time Windows® is started. The Control Center will appear as an icon in the task tray.

If you click **No** the Scan key on the machine will be disabled.

NOTE:

*Even if you select **NO**, you will be able to launch the Brother Control Center later to use the Scan key by double-clicking the Smart UI icon on the desktop. This loads the Brother Control Center to the task tray. See AutoLoad the Brother Control Center, Chapter 4 in the Documentation (Software User's Guide) located on the CD-ROM.*

OK:

A Basic Universal printer driver was installed with the MFL-PRO Software Suite which is certified for use with Windows® operating systems.

Brother also offers a fully featured printer driver (Native driver) that includes more features than the Basic Universal driver. However, this driver does not include a Windows® certificate. To install the Brother Native driver proceed to step (25).

NOTE:

For details on what features are available, see chapter 2 of the Software User's Guide.

Brother Native driver Installation

(25) Click **Start** and select **Settings** and then **Printers**. Click on **Add Printer** and the Add Printer Wizard will start.

When this screen appears, click **Next**.

(26) Un-check the **Automatically detect and install my Plug and Play printer** selection and then click **Next**.

(27) Select **BMFC (Brother MFL Port)** from the pull down window for the Printer Port Selection and then click **Next**.

(28) Click on **Have Dis**k.

(29) Browse the CD-ROM and highlight your language folder and click **Open**.
Highlight the **W2K** folder and click **Open**.
Highlight the **Addprt** folder and click **Open**.

(30) Click **Open**.

(31) Make sure **X: \ENG\W2K\Addprt** is displayed in the window and click **OK** (X:\ is the drive letter of your CD-ROM).

(32) Highlight the model you are installing from the list of machines and click **Next**.

NOTE:
Make sure you select a USB printer.

(33) The model you are installing will be listed in the window. Select **Yes** or **No** if you want this driver to be your default printer and then click **Next**.

(34) If this screen appears, select **Do not share this printer** and **Next**.

(35) Select **Yes** and **Next** to print a test page.

(36) When this screen appears, click **Finish**.

(37) If the **Digital Signature Not Found** dialog box appears, click **Yes**.

(38) If the test page printed, click **OK**.

NOTE:
- *There will be two Brother printer drivers listed in the Printers selection.*
- *The driver with "Printer" after the model name (ex. Brother MFC-8220 Printer) is the Brother Native Driver.*

OK:
The Brother Native Drivers have been installed and the installation is now complete.

< For Windows® XP Users Only >

Make sure that you followed the instructions in (1) to (16) on pages 2-18 to 2-19.

(17) When this screen appears, connect the parallel interface cable to your PC, and then connect it to the machine.
Plug the machine into the AC power outlet. Turn the power switch on.

Caution
Do not plug the power cord before connecting the parallel interface cable. It may cause damage to your machine.

The installation of the Brother drivers will automatically start.
The screen appears one after another, please wait for a while.

(18) The README file will be displayed.
Please read this file for troubleshooting information and then close the file to continue installation.

(19) Check the **Run On-Line Registration** and then click **Next**.

(20) When the following screen appears, click **Finish** and wait as the PC restarts Windows® and continues the installation.

OK:

A Basic Universal printer driver was installed with the MFL-PRO Software Suite which is certified for use with Windows® operating systems.

Brother also offers a fully featured printer driver (Native driver) that includes more features than the Basic Universal driver. However, this driver does not include a Windows® certificate. To install the Brother Native driver proceed to step (21).

NOTE:

For details on what features are available, see chapter 2 of the Software User's Guide.

Brother Native driver Installation

(21) Click **Start** and select **Printers and Faxes**.
Click on **Add a printer** and the Add Printer Wizard will start.
When this screen appears, click **Next**.

(22) Un-check the **Automatically detect and install my Plug and Play printer** selection and then click **Next**.

(23) Select **BMFC (Brother MFL Port)** from the pull down window for the Printer Port Selection and then click **Next**.

(24) Click on **Have Disk**.

(25) Browse the CD-ROM and highlight your language folder and click **Open**.
Highlight the **WXP** folder and click **Open**.
Highlight the **Addprt** folder and click **Open**.

(26) Click **Open**.

(27) Make sure **X: \ENG\W2K\Addprt** is displayed in the window and click **OK** (X:\ is the drive letter of your CD-ROM).

(28) Highlight the model you are installing from the list of machines and click **Next**.

NOTE:

Make sure you select a USB printer.

(29) The model you are installing will be listed in the window. Select **Yes** or **No** if you want this driver to be your default printer and then click **Next**.

(30) If this screen appears, select **Do not share this printer** and **Next**.

(31) Select **Yes** and **Next** to print a test page.

(32) When this screen appears, click **Finish**.

(33) When this screen appears, click **Continue Anyway**.

NOTE:

- *There will be two Brother printer drivers listed in the Printers selection.*
- *The driver with "Printer" after the model name (ex. Brother MFC-8220 Printer) is the Brother Native Driver.*

OK:

The Brother Native Drivers have been installed and the installation is now complete.

3.2.3 For Windows NT® Workstation Version 4.0 Users

(1) Turn on your computer.
You must be logged on as the Administrator.

(2) Connect the parallel interface cable to your computer, and then connect it to the machine.

> ***Caution***
> ***Do not plug the power cord before connecting the parallel interface cable. It may cause damage to your machine.***

(3) Plug the machine into the AC power outlet. Turn the power switch on.

(4) Insert the supplied CD-ROM for Windows® into your CD-ROM drive. If the model name screen appears, select your machine. If the language screen appears, select your language.

(5) The CD-ROM main menu will appear.
Click **Install Software**.

NOTE:
*If this window does not appear, use Windows® Explore to run the **setup.exe** program from the root directory of the Brother CD-ROM.*

(6) Click **MFL-Pro Suite** in Main Application.

NOTE:
- *MFL-Pro Suite includes Printer Driver, Scanner Driver, ScanSoft® PaperPort® ScanSoft®, Text Bridge®, PC-FAX software, Remote Setup and True Type fonts.*
- *PaperPort® is a document management application for viewing scanned documents.*
- *ScanSoft® TextBridge®, which is integrated into PaperPort®, is an OCR application that converts an image into text and inserts it into your default word processor.*

(7) Click **Install**.

NOTE:
- *If you see the following screen, click **OK** to install the Windows® updates. After the updates are installed your PC may restart.*
- *If it does the installation will automatically continue.*
- *If the installation does not continue automatically, please open the installer menu again by double-clicking the **setup.exe** program on the Brother CD-ROM, and continue from Step (5).*

(8) When the **PaperPort 8.0 SE Setup** window is displayed, click **Next**.

(9) After reading and accepting the ScanSoft® License Agreement, enter your user information and click **Next**.

(10) Select Typical and click **Next**.

(11) Click **Install** and PaperPort® will start installing on your computer.

(12) When the **PaperPort 8.0 SE Registration** screen is displayed, make your selection and follow the on- screen instructions.

(13) Click **Finish** to complete installation.

(14) When the **Brother MFL-Pro Suite Installation** window appears, click **Next**.

NOTE:

*If an error message appears at this point in the installation process, or you have previously installed MFL-Pro Suite, you will first have to uninstall it. From the **Start** menu, select **Programs**, **Brother**, **Brother MFL-Pro Suite, Uninstall**, and then follow the instructions on the screen.*

(15) When the Brother Software License Agreement window appears, click **Yes.** If you agree to it and go to next screen.

(16) Select **Local Interface**, and then click **Next**.

(17) When the Setup Type window appears, select **Standard**, and then click **Next**.

NOTE:

*If you want to install the PS Brother (PostScript®) driver, select **Custom** and then follow the on-screen instructions. When the **Select Components** screen appears, check **PS Printer Drive**r, and then continue following the on-screen instructions.*

(18) The README file will be displayed.

Please read this file for troubleshooting information and then close the file to continue installation.

(19) Check the **Run On-Line Registration** and then click **Next**.

(20) Click **Finish** to restart your computer.

(21) After the computer restarts, click **Yes** to have the Control Center load each time Windows® is started. The Control Center will appear as an icon in the task tray.

If you click **No** the Scan key on the machine will be disabled.

NOTE:

*Even if you select **NO**, you will be able to launch the Brother Control Center later to use the Scan key by double-clicking the Smart UI icon on the desktop. This loads the Brother Control Center to the task tray. See AutoLoad the Brother Control Center, Chapter 4 in the Documentation (Software User's Guide) located on the CD-ROM.*

OK:

The Brother PC-FAX, Printer and Scanner drivers have been installed and the installation is now complete.

3.2.4 For Optional NC-9100h Network Interface Users (For Windows® 95/98/98SE/Me/NT/2000 Professional/XP)

(1) Make sure that the NC-9100h (Network Print/Fax Server) is installed into the MFC.
(See "Optional accessories" in Chapter 13 of the User's Guide.)

(2) Connect the network cable to the machine, and then connect it to a free port on your hub.
Plug the machine into the AC power outlet. Turn the power switch on.

(3) Turn on your computer.
(For Windows® 2000 Professional/XP and Windows NT® 4.0, you must be logged on as the administrator.)

(4) Insert the supplied CD-ROM for Windows® into your CD-ROM drive. If the model name screen appears, select your machine. If the language screen appears, select your language.

(5) The CD-ROM main menu will appear.
Click **Install Software**.

NOTE:

*If this window does not appear, use Windows ® Explore to run the **setup.exe** program from the root directory of the Brother CD-ROM.*

(6) Click **MFL-Pro Suite** in Main Application.

NOTE:

- *MFL-Pro Suite includes Printer Driver, Scanner Driver, ScanSoft® PaperPort®, ScanSoft® Text Bridge®, PC-FAX software and True Type fonts.*
- *PaperPort® is a document management application for viewing scanned documents.*
- *ScanSoft® TextBridge®, which is integrated into PaperPort®, is an OCR application that converts an image into text and inserts it into your default word processor.*

(7) Click **Install**.

NOTE:

- *If you see the following screen, click **OK** to install the Windows® updates. After the updates are installed your PC may restart.*
- *If it does the installation will automatically continue.*
- *If the installation does not continue automatically, please open the installer menu again by double-clicking the **setup.exe** program from the root directory of the Brother CD-ROM, and continue from Step (5).*

(8) When the **PaperPort 8.0 SE Setup** window is displayed, click **Next**.

(9) After reading and accepting the ScanSoft® License Agreement, enter your user information and click **Next**.

(10) Select **Typical** and click **Next**.

(11) Click **Install** and PaperPort® will start installing on your computer.

(12) When the **PaperPort 8.0 SE Registration** screen is displayed, make your selection and follow the on- screen instructions.

(13) Click **Finish** to complete installation.

(14) When the Brother MFL-Pro Suite Installation window appears, click **Next**.

NOTE:

*If an error message appears at this point in the installation process, or if you have previously installed the MFL-Pro Suite, you will first have to uninstall it. From the **Start** menu, select **Programs, Brother**, **Brother MFL-Pro Suite**, **Uninstall**, and then follow the instructions on the screen.*

(15) When the Brother Software License Agreement window appears, click **Yes**.

(16) Select **Network Interface**, and then click **Next**.

(17) Select **Standard**, and then click **Next**.
The application files will be copied to your computer.

NOTE:

*If you want to install the PS Brother (PostScript®) driver, select **Custom** and then follow the on-screen instructions. When the **Select Components** screen appears, check **PS Printer Drive**r, and then continue following the on-screen instructions.*

(18) Select **Search the network for devices and choose from a list of discovered devices (Recommended)**, and then click **Next**.

NOTE:

*If you see the following screen, click **OK**.*

(19) If the machine is un-configured for your network:
Select the APIPA or un-configured device from the list and then click **Next**. **Go to (20)**

If the machine is configured for your network:
Select the machine from the list and then click **Next**. **Go to (23)**

(20) Click **Configure IP Address**.

(21) Enter the proper IP Address information for your network, and then click **O**K.
(e.g. Enter 192.168.0.105 for IP Address)

(22) Click **Next**.

NOTE:

See the For Administrator section of this guide or the NC-9100h User's Guide located on the CD-ROM for more network configuration information.

Windows® 98/98SE/Me/2000/XP Users **Go to (23)**

Windows® 95/NT Users **Go to (26)**

(23) Select yes and then click **Next**.

(24) Click **Next** or enter the name you want displayed on the LCD for your PC and then click **Next**. The default name is the name of your PC.

NOTE:

You can avoid receiving unwanted documents by setting a 4-digit PIN Number.

Please wait for the window to open.

(25) The README file will be displayed. Please read this file for troubleshooting information and then close the file to continue installation.

(26) Check the **Run On-Line Registration** and then click **Next**.

(27) Click **Finish** restart your computer.
Windows ® 95/98/98SE/Me/NT/2000 Users follow step (27).

NOTE:

The Network Scanning feature is not supported in Windows®95 or NT.

OK:

For Windows® XP Users Only

The Brother PC-FAX, Printer and Scanner drivers have been installed and the installation is now complete.

(28) After the computer restarts, click **Yes** to have the Control Center load each time Windows® is started. The Control Center will appear as an icon in the task tray.

If you click **No** the Scan key on the machine will be disabled.

NOTE:

*Even if you select **NO**, you will be able to launch the Brother Control Center later to use the Scan key by double-clicking the Smart UI icon on the desktop. This loads the Brother Control Center to the task tray. See AutoLoad the Brother Control Center, Chapter 4 in the Documentation (Software User's Guide) located on the CD-ROM.*

OK:

For Windows® 98/98SE/Me/2000 Users

The Brother PC-FAX, Printer and Scanner drivers have been installed and the installation is now complete.

For Windows® 95/NT Users

The Brother PC-FAX and Printer drivers have been installed and the installation is now complete.

3.2.5 For USB Interface Cable Users (For Mac® OS 8.6 to 9.2 Users)

(1) Switch off and unplug the machine from the AC outlet and disconnect it from your Macintosh® if you already connected an interface cable.

(2) Turn on your Macintosh®.

(3) Insert the supplied CD-ROM for Macintosh® into your CD-ROM drive.

(4) Double-click the **Start Here** icon to install the printer, scanner and PC-FAX Send drivers. If the language screen appears, select your language.

(5) Click **Install** next to the MFL-Pro Suite for your country.

(6) After the installation is completed, restart your Macintosh®.

(7) Connect the USB interface cable to your Macintosh®, and then connect it to the machine.

Caution
Do not connect the machine to a USB port on a keyboard or a non powered USB hub.

(8) Plug the machine into the AC power outlet. Turn the power switch on.

(9) From the Apple® menu, open the **Chooser**.

(10) Click the **Brother Laser** icon you installed.
On the right side of the **Chooser**, select the printer to which you want to print.
Close the **Chooser**.

OK:
The Brother PC-FAX Send, Printer and Scanner drivers have been installed.

(11) To install Presto! ® PageManager®, click **Install** next to the Presto! PageManager icon and follow on the Screen instructions.

NOTE:
You can easily scan, share and organize photos and documents using Presto! ® PageManager®.

OK:
Presto! ® PageManager® has been installed and the installation is now complete.

3.2.6 For USB Interface Cable Users (For Mac OS® X 10.1/10.2.1 or greater Users)

(1) Turn off and unplug the machine from the AC outlet and disconnect it from your Macintosh® if you already connected an interface cable.

(2) Turn on your Macintosh®.

(3) Insert the supplied CD-ROM for Macintosh® into your CD-ROM drive.

(4) Double-click the **Start Here OSX** icon to install the printer driver, Scanner driver, Brother PC-FAX Send and Remote Setup program. If the language screen appears, select your language. (Scanning is not supported in Mac OS® 10.1.)

(5) Click **Install** next to the MFL-Pro Suite.

(6) Select **USB Interface**, and then click **Install**.

(7) Connect the USB interface cable to your Macintosh®, and then connect it to the machine.

Caution
Do not connect the machine to a USB port on a keyboard or a non powered USB hub.

(8) Plug the machine into the AC power outlet. Turn the power switch on.

(9) Select **Applications** from the **Go** menu.

(10) Open the **Utilities** folder.

(11) Open the **Printer Center** icon.

(12) Click **Add Printer...**.

(13) Select **USB**.

(14) Select your machine, and then click **Add**.

(15) Select **Quit Printer Center** from the **Printer Center** menu.

OK:
The Brother Printer driver, Scanner driver, Brother PC-FAX Send and Remote Setup Program have been installed and the installation is now complete.

(16) To install Presto! ® PageManager®, click **Install** next to the Presto! PageManager icon and follow on the Screen instructions.

NOTE:
You can easily scan, share and organize photos and documents using Presto! ® PageManager®.

OK:
Presto! ® PageManager® has been installed and the installation is now complete.

3.2.7 For Optional NC-9100h Network Interface Users (For Mac OS® 8.6 to 9.2 Users)

(1) Make sure that the NC-9100h (Network Print/Fax Server) is installed into the MFC.

(See "Optional accessories" in Chapter 13 of the User's Guide.)

(2) Turn off and unplug the machine from the AC outlet and disconnect it from your Macintosh® if you already connected an interface cable.

(3) Turn on your Macintosh®.

(4) Insert the supplied CD-ROM for Macintosh® into your CD-ROM drive.

(5) Double-click the **Start Here** icon to install the printer, scanner and PC-FAX Send drivers. If the language screen appears, select your language.

(6) Click **Install** next to the MFL-Pro Suite for your country.

(7) After the installation is completed, restart your Macintosh®.

(8) Connect the network interface cable to the printer, and then connect it to a free port on your hub.

(9) Plug the machine into the AC power outlet. Turn the power switch on.

(10) Open the **Chooser** from the **Apple** menu.

(11) Click the **Brother Laser (AT)** icon, and then select **BRN_xxxxxx_P1**.
Click **Setup.**

NOTE:
xxxxxx are the last six digits of the Ethernet address.

(12) Click **OK**, and then close the **Chooser**.

NOTE:
Network User's Guide Chapter 7 on the CD-ROM.

OK:
The setup is now complete.

3.2.8 For Optional NC-9100h Network Interface Users (For Mac OS® X 10.1/10.2.1 or greater Users)

(1) Make sure that the NC-9100h (Network Print/Fax Server) is installed into the MFC.
(See "Optional accessories" in Chapter 13 of the User's Guide.)

(2) Turn off and unplug the machine from the AC outlet and disconnect it from your Macintosh® if you already connected an interface cable.

(3) Turn on your Macintosh®.

(4) Insert the supplied CD-ROM for Macintosh® into your CD-ROM drive.

(5) Double-click the **Start Here OSX** folder to install the printer driver and Remote Setup program. If the language screen appears, select your language.

(6) Click **Install** next to the MFL-Pro Suite for your country.

(7) Select **Network Interface**, and then click **Install**.

(8) Connect the network interface cable to the printer, and then connect it to a free port on your hub.

(9) Plug the machine into the AC power outlet. Turn the power switch on.

(10) Select **Applications** from the **Go** menu.

(11) Open the **Utilities** folder.

(12) Open the **Print Center** icon.

(13) Click the **Add Printer...** button.

(14) Select **AppleTal**k.

(15) Select **BRN_xxxxxx_P1**, and then click the **Add** button.

NOTE:
xxxxxx are the last six digits of the Ethernet address.

Network User's Guide Chapter 7 on the CD-ROM.

(16) Select **Quit Printer Center** from the **Printer Center** menu.

OK:
The setup is now complete.

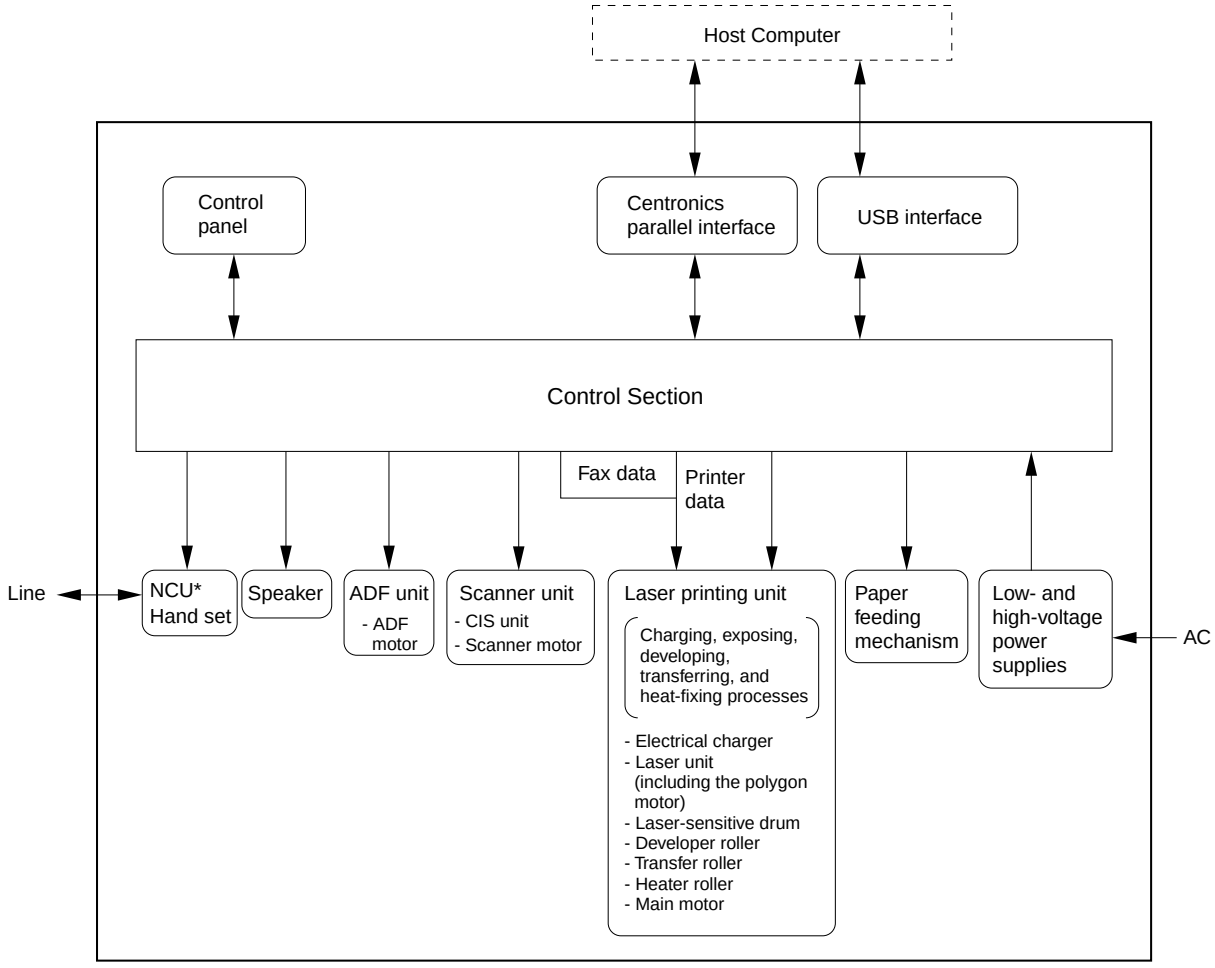
NOTE:
For users of Mac OS® 10.2.2 or greater Please see Network User's Guide Chapter 7 on the CD-ROM for information about using Rendezvous™.

CHAPTER 3 THEORY OF OPERATION

1. ELECTRONICS

1.1 General Block Diagram

Fig. 3-1 shows a general block diagram.



*Provided on models supporting facsimile function.

Fig. 3-1

1.2 Main PCB Block Diagram

Fig. 3-2 shows the block diagram of the main PCB.

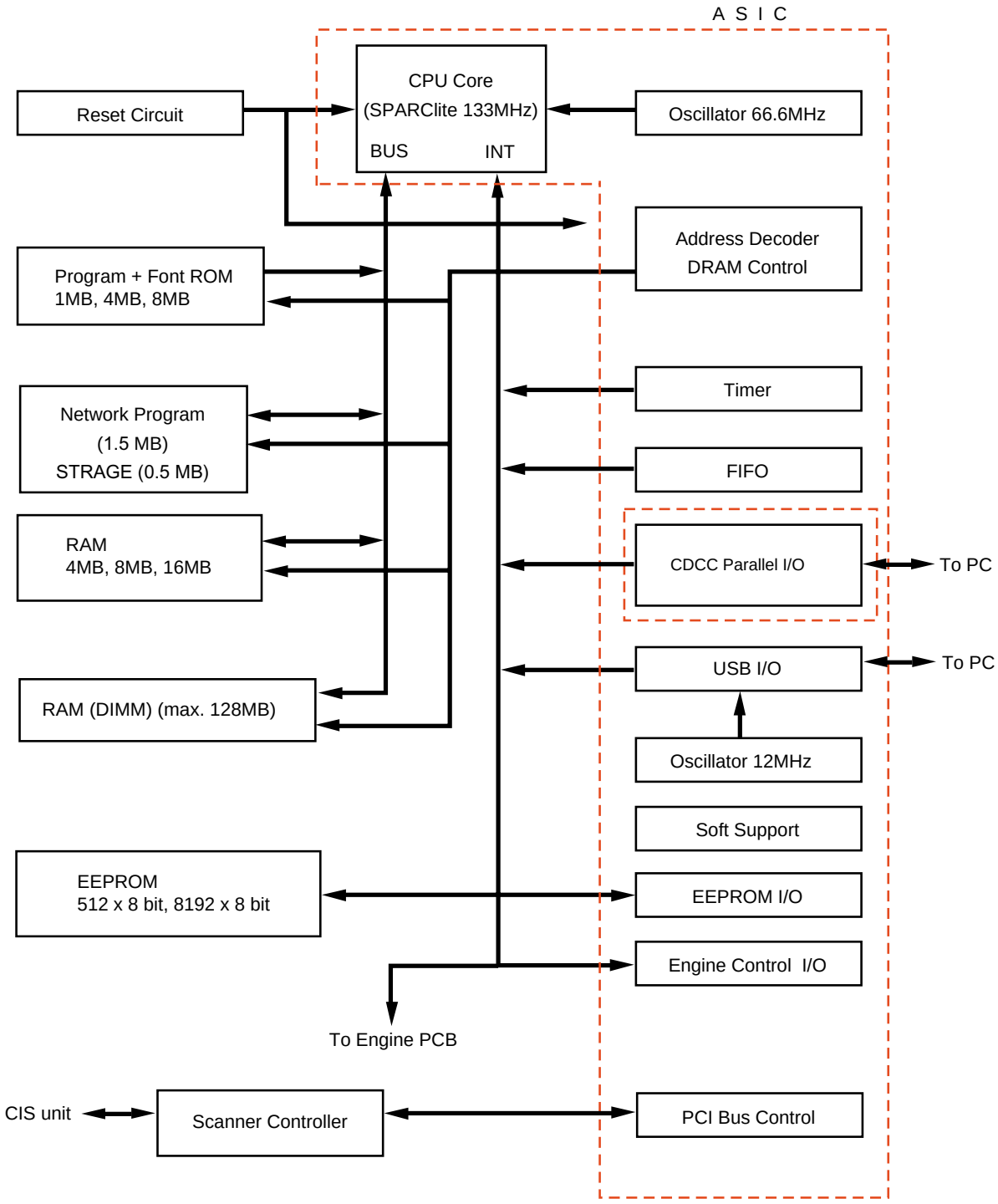


Fig. 3-2

1.3 Main PCB

For the entire circuit diagram of the main PCB, see APPENDIX 4.1 to 4.6 'MAIN PCB CIRCUIT DIAGRAM' in this manual.

1.3.1 CPU

A Fujitsu 32bit RISC CPU, SPARClite is built in the ASIC. While the CPU is driven with a clock frequency of 66.66 MHz in the user logic block, it itself runs at 133.33 MHz, which is generated by multiplying the source clock by two.

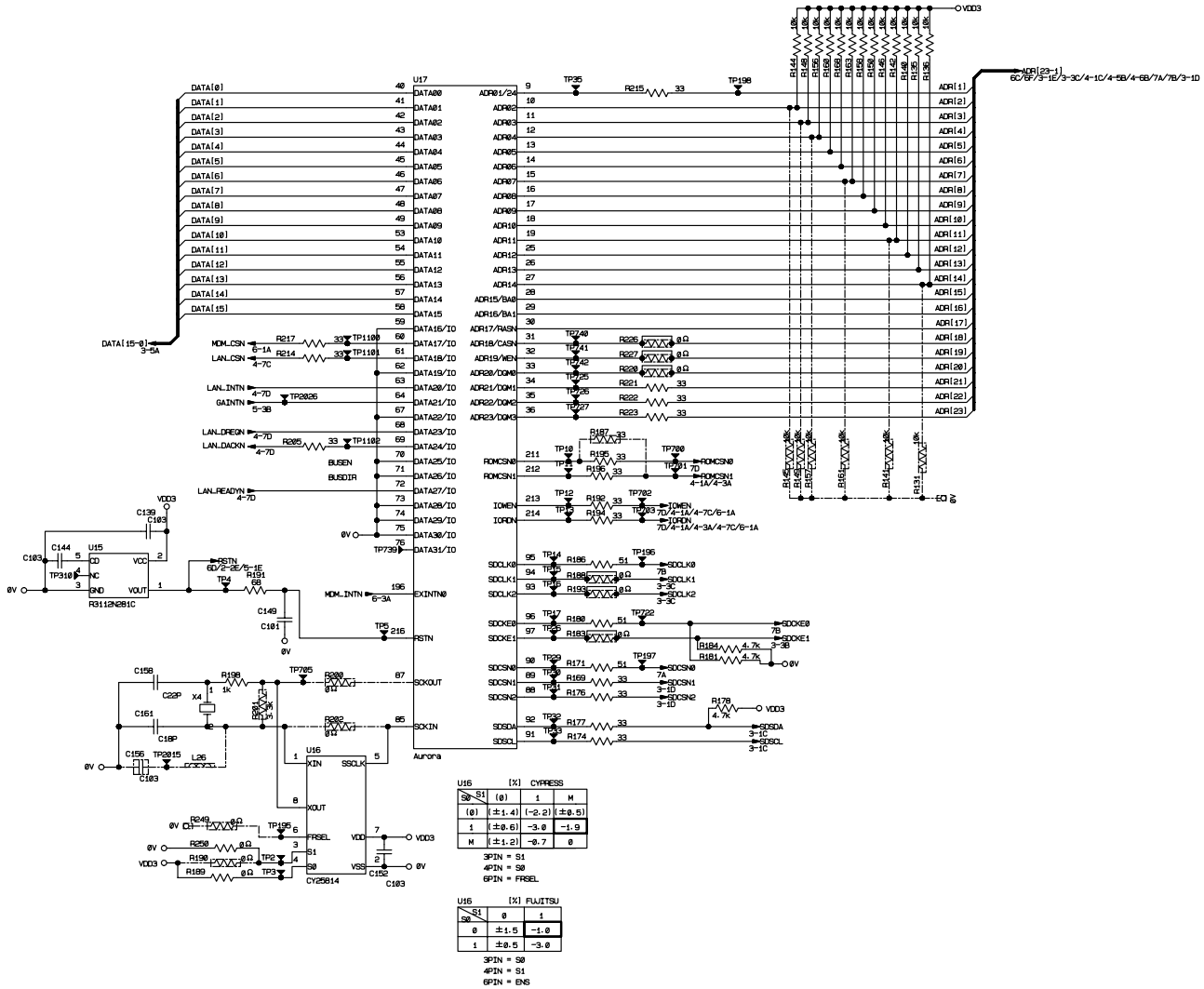


Fig. 3-3

The functions of the interface block communication with external devices are described below;

1.3.2 USB

Stores the data received from the PC into DRAM as controlled by the DMA controller. The transmission speed is 480Mbps or 12Mbps.

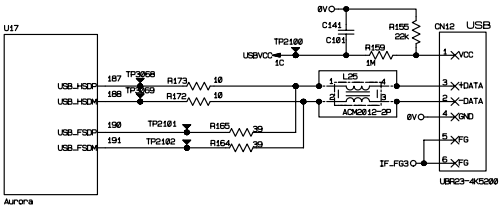


Fig. 3-4

1.3.3 IEEE1284

Stores the data received from the PC into DRAM as controlled by the DMA controller. It is applicable to both normal receiving and bi-directional communication (nibble mode, byte mode, ECP mode).
74LVX161284, 3.3V ⟷ 5.0V level shifter IC stores the pull-up resistance in signal wire at the connector side

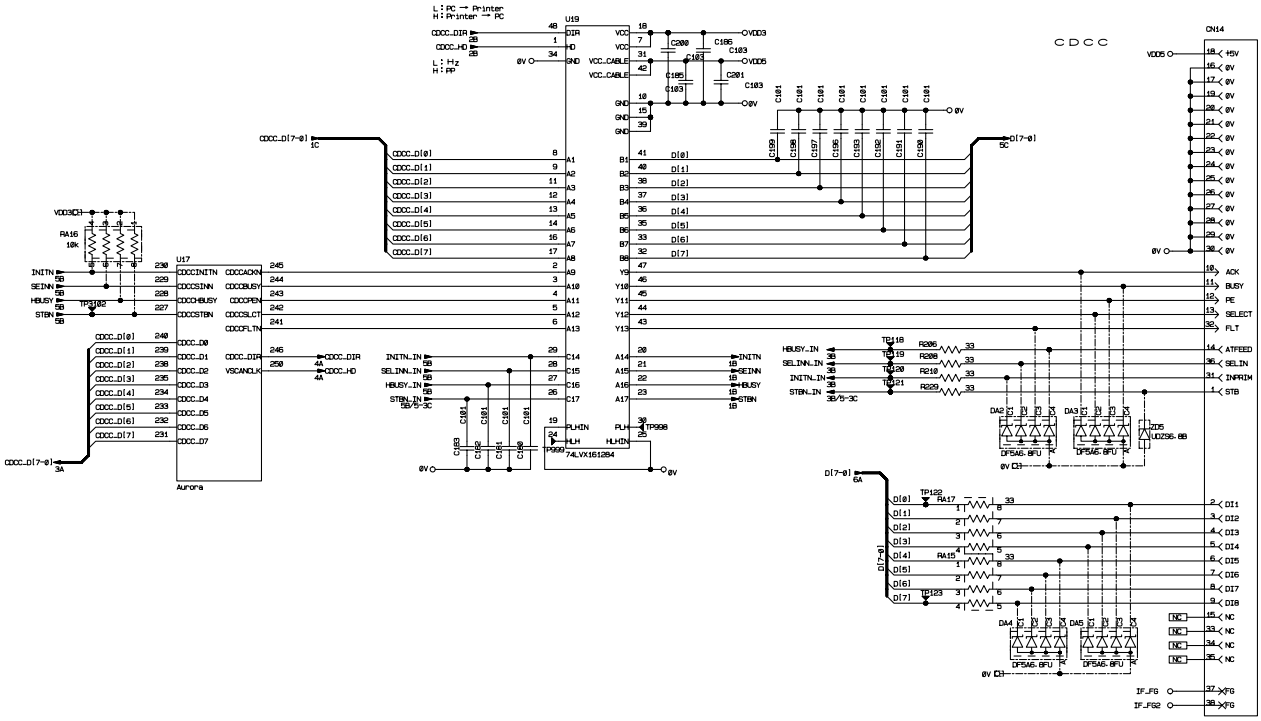
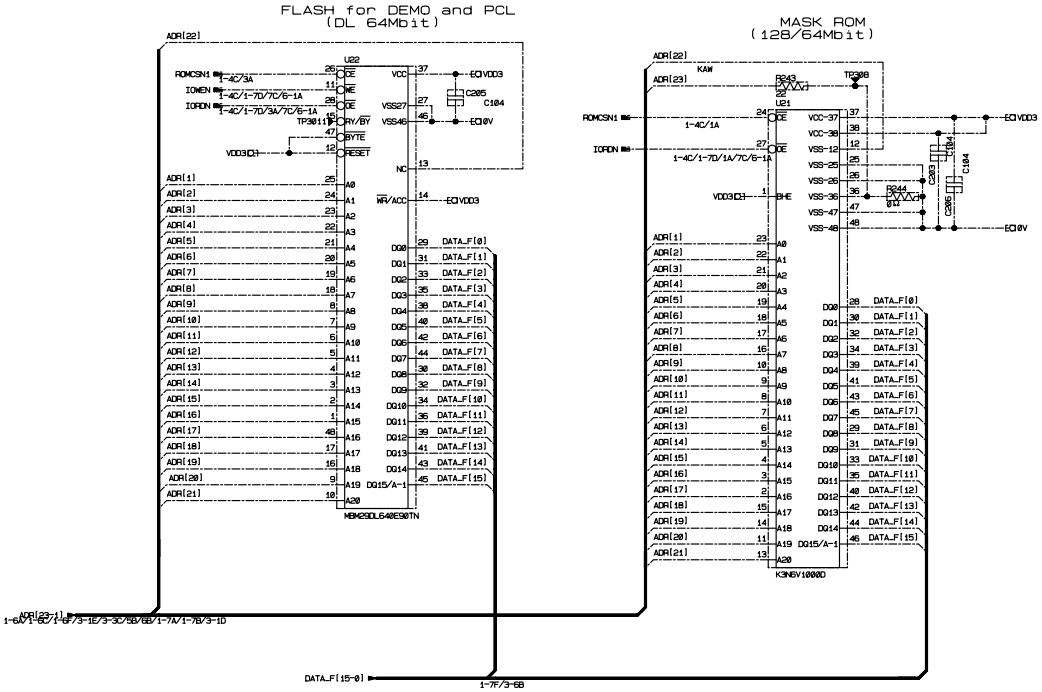


Fig. 3-5

1.3.4 ROM



FLASH PIN

PIN	FUJITSU LV type 64M	TOSHIBA FUJITSU DL type Mirror 64M	32M	16M	8M	OKI P2ROM 64M	OKI P2ROM 32M
9	A20	A19	A19	A19	NC	A19	A19
13	ACC	A21	NC	NC	NC	A21	NC
14	WP	WP/ACC	WP/ACC	NC	NC	NC	NC
15	A19	RY/BY	RY/BY	RY/BY	RY/BY	NC	NC
47	Vccq	Byte	Byte	Byte	Byte	Byte	Byte

※SHARP

MASK ROM PIN

PIN	MXIC 128M	MXIC 64M	MXIC non-page 32M	MXIC 32M	MXIC non-page 8M
11	A19	A19	A19	A19	NC
12	A21	A21	Vss	Vss	Vss
13	A20	A20	A20	A20	NC
36	A22	NC	Vss	NC	NC

Fig. 3-6

1.3.5 Flash ROM

A 32Mbit flash ROM (x 16bit) is fitted.

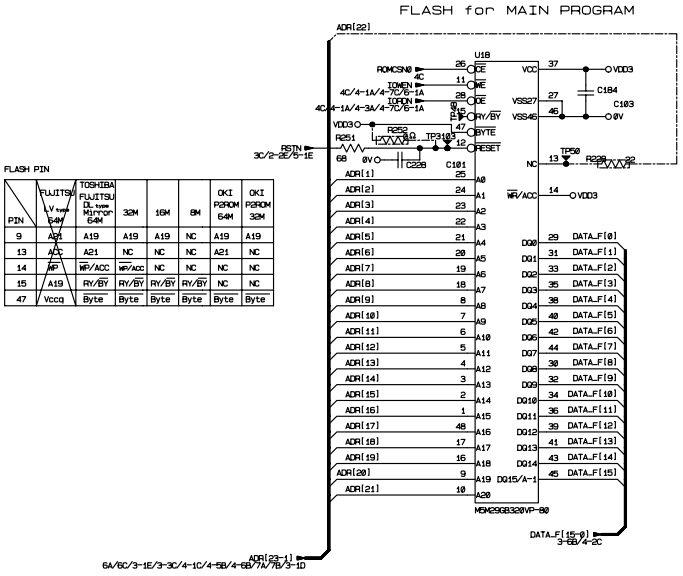


Fig. 3-7

1.3.6 SDRAM

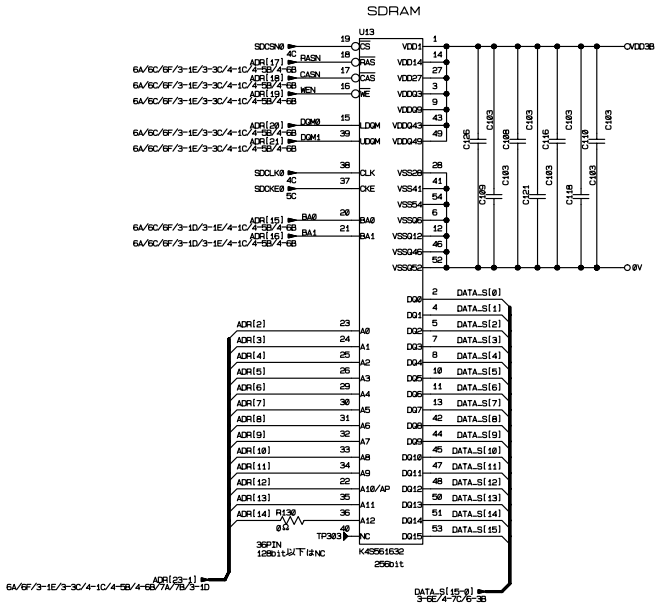


Fig. 3-8

1.3.7 Optional RAM

A 32bit (100 pin) DIMM can be fitted as optional RAM. The main PCB has one slot and the capacity of DIMM can be from 16MB to 128MB.

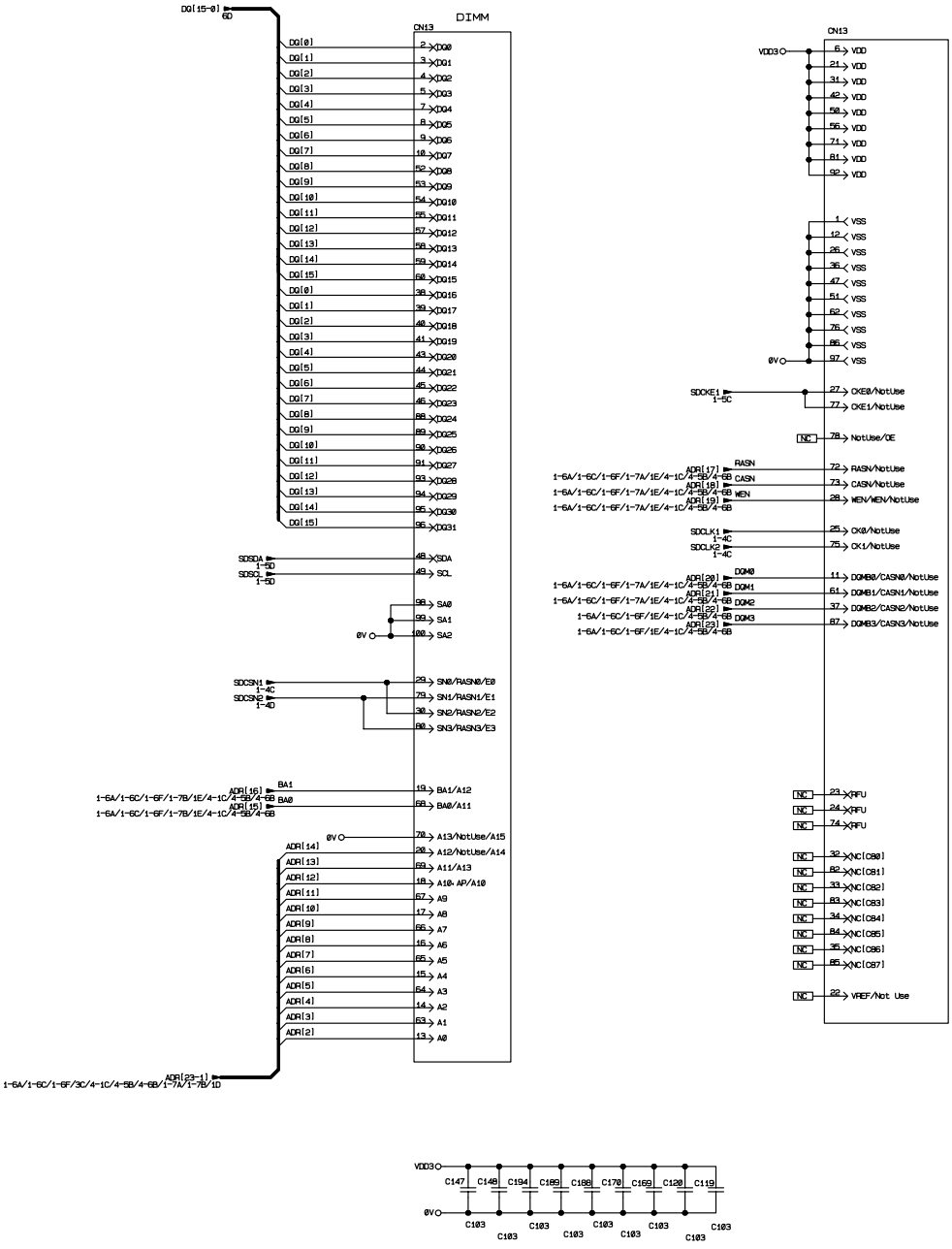


Fig. 3-9

1.3.8 EEPROM

The EEPROM is BR24126 type of two-wire method with a 8192 x 8bit configuration.

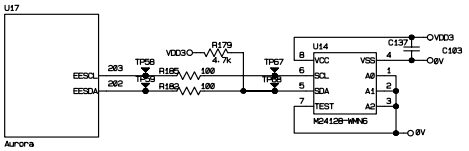


Fig. 3-10

1.3.9 Reset circuit

The reset IC is a R3112N281C. The reset voltage is 2.8V (typ.) and the LOW period of reset is 22.4ms (typ.)

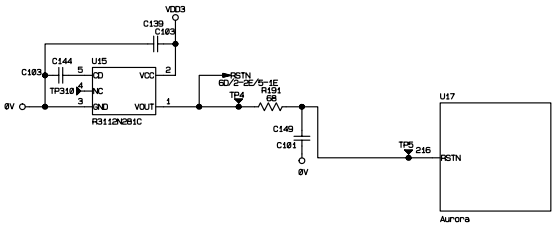


Fig. 3-11

1.3.10 Engine I/O

The interface with the engine PCB is by full-duplex synchronous serial method, of which transfer rate is 520kbps.

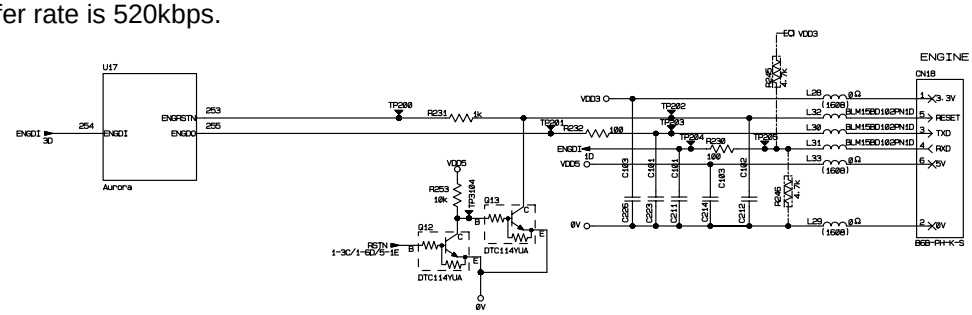


Fig. 3-12

1.3.11 Panel I/O

The interface with the panel PCB is by full-duplex synchronous serial method.

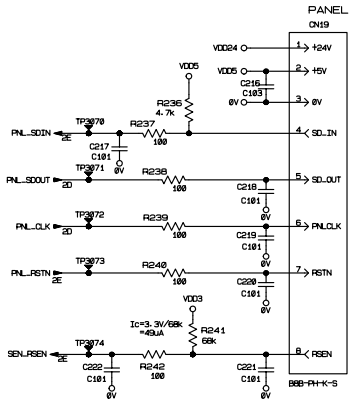


Fig. 3-13

1.3.12 Video I/O

The video signal output from the ASIC is reversed through a transistor and output after being corrected by the buffer IC.

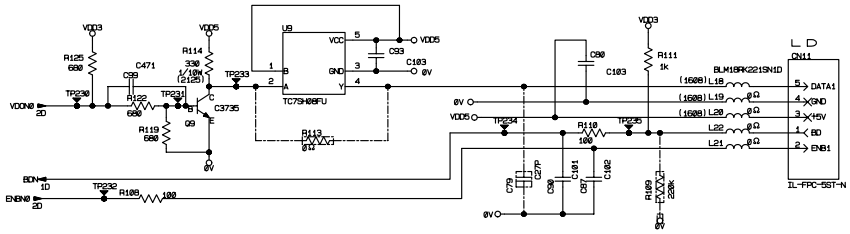


Fig. 3-14

1.3.13 Scanner control

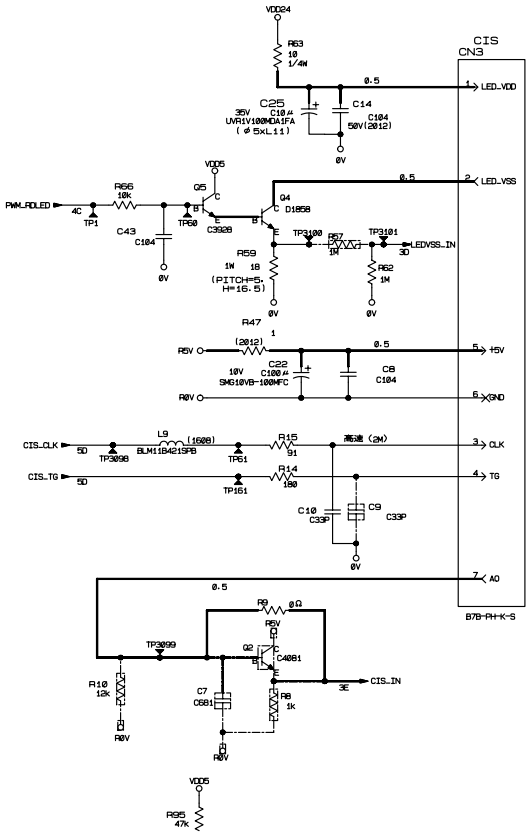


Fig. 3-15

1.3.14 Power supply

+5V is generated by the 3-pin regulator from astable 7V supplied from the LVPS. +5V is used for the IEEE1284 interface, the LD PCB and the engine PCB. In addition, +1.9V is generated by the 3-pin regulator from 3.3V supplied from the LVPS. +1.9V is used for the CPU within the ASIC and the logic circuit.

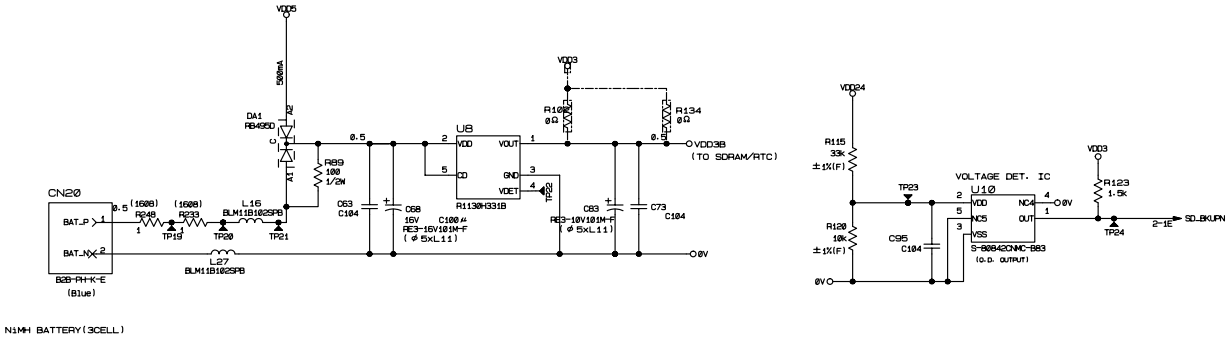


Fig. 3-16

1.4 Engine PCB

The gate array which transforms the serial signal from the main PCB into the parallel signal is mounted on the engine PCB.

The engine PCB controls the following parts by using the transferred signal data;

- Main motor
- Fan motor
- Thermistor
- Polygon motor
- High-voltage power supply
- Toner sensor
- Cover sensor
- Front regist sensor
- Rear regist sensor
- Solenoid
- Upper cassette sensor
- Lower cassette sensor
- Upper paper exist sensor
- Lower paper exist sensor
- Lower cassette exist sensor
- Paper eject sensor
- Fixing unit cover sensor

For the circuit diagram of the engine PCB, see APPENDIX 4.7 and 4.8 'ENGINE PCB CIRCUIT DIAGRAM' in this manual.

Sensor configuration varies according to machine types.

	MFC-8220
Upper cassette sensor	○
Upper paper exit sensor	○

○ : Built-in ×: Not built-in

1.5 Power Supply

1.5.1 Low-voltage power supply

The power supply uses a switching regulation system to generate the regulated DC power (+3.3V, +8V [non regulated] and +24V), which are converted from the AC line.

The regulated output is listed below;

Regulated Output
+3.3V / 1.5A
+8V / 0.7A
+24V / 2.9A

For the circuit diagram of the low-voltage power supply PCB, see APPENDIX 4.12 'LOW-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM' in this manual.

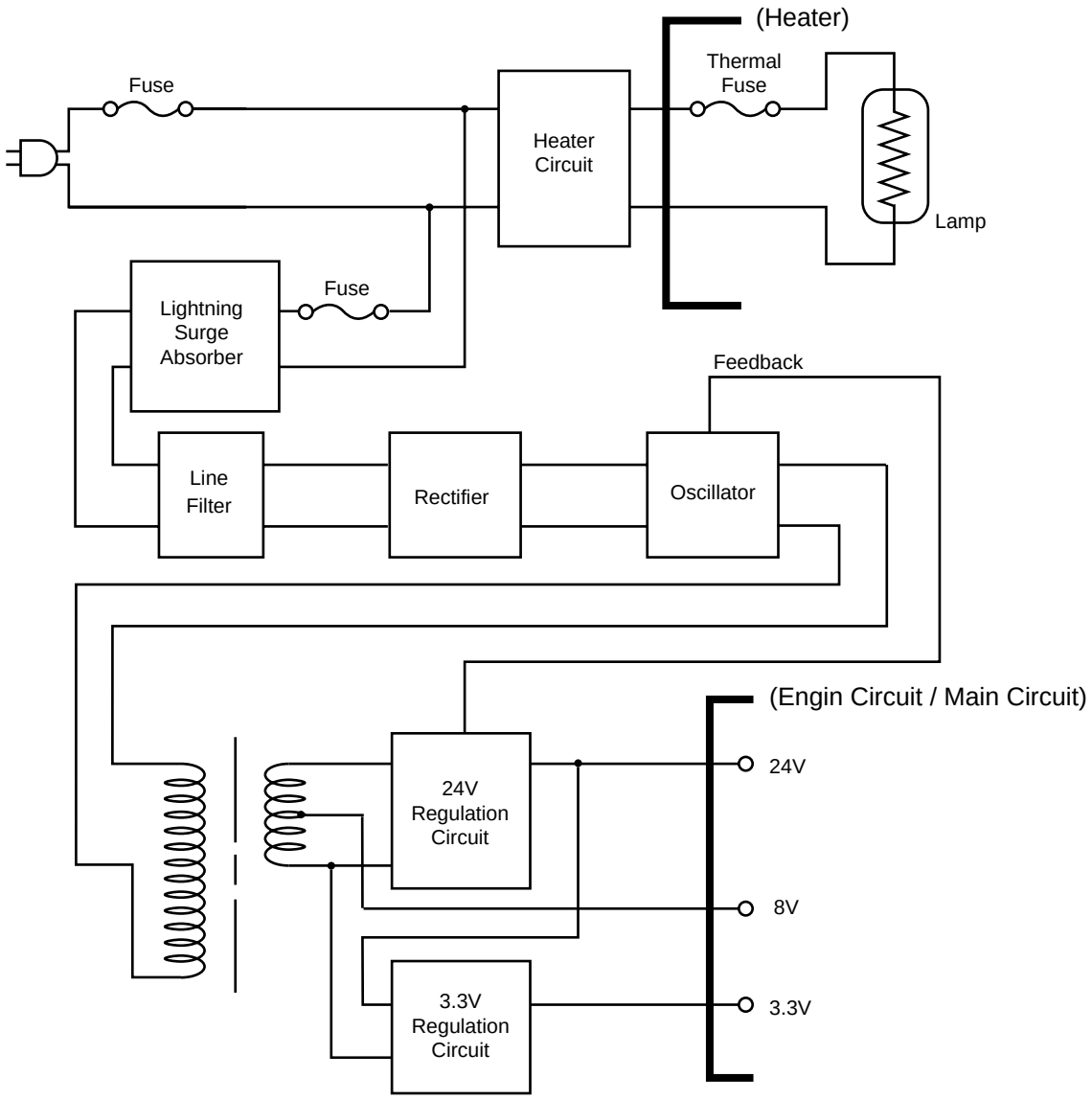


Fig. 3-17

1.5.2 High-voltage power supply

The high-voltage power supply generates and outputs the voltages and currents for the charging, development and transfer functions.

For the circuit diagram of the high-voltage power supply PCB, see APPENDIX 4.13 and 4.14 'HIGH-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM' in this manual.

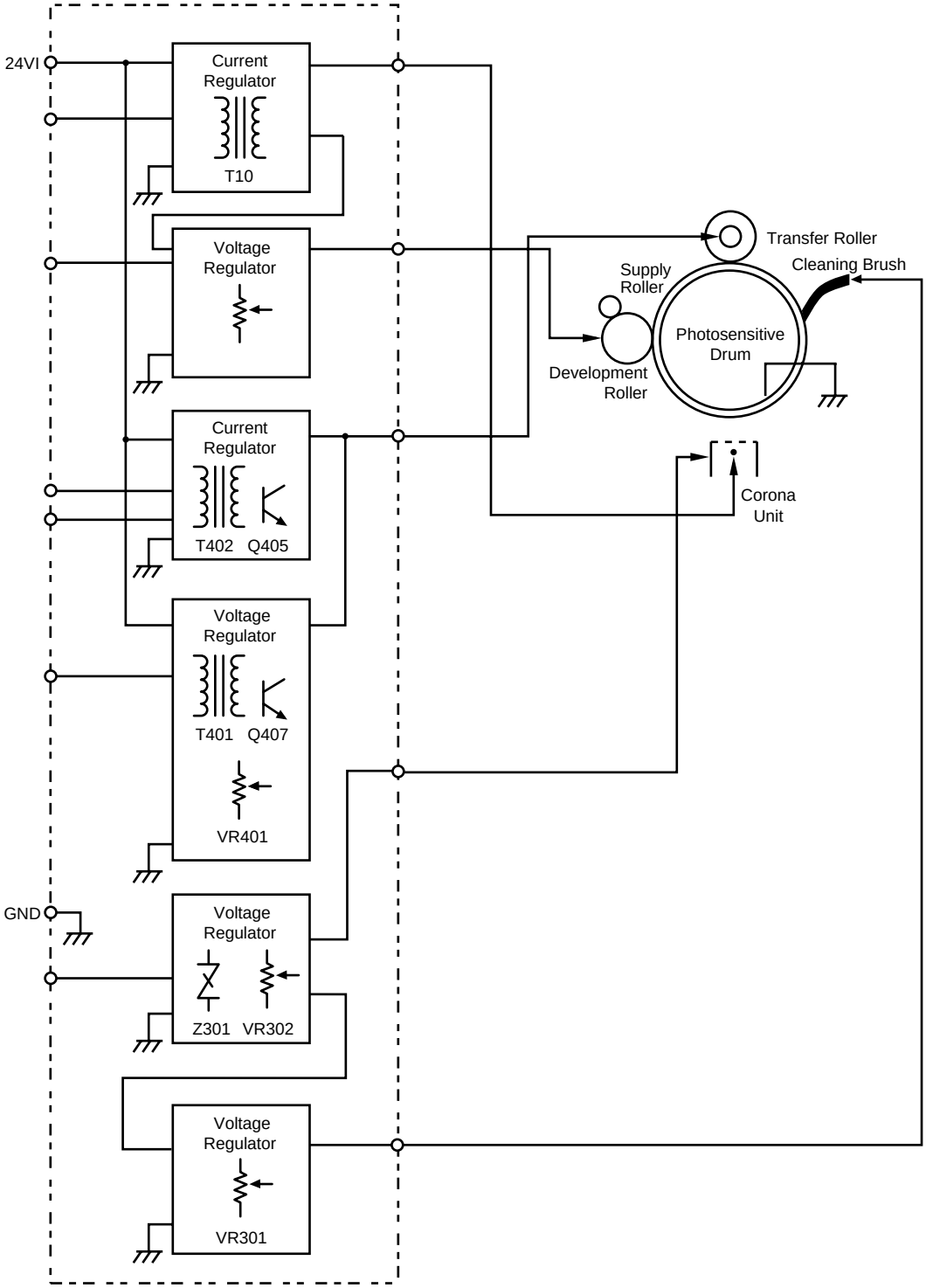


Fig. 3-18

2. MECHANICS

2.1 Overview of Printing Mechanism

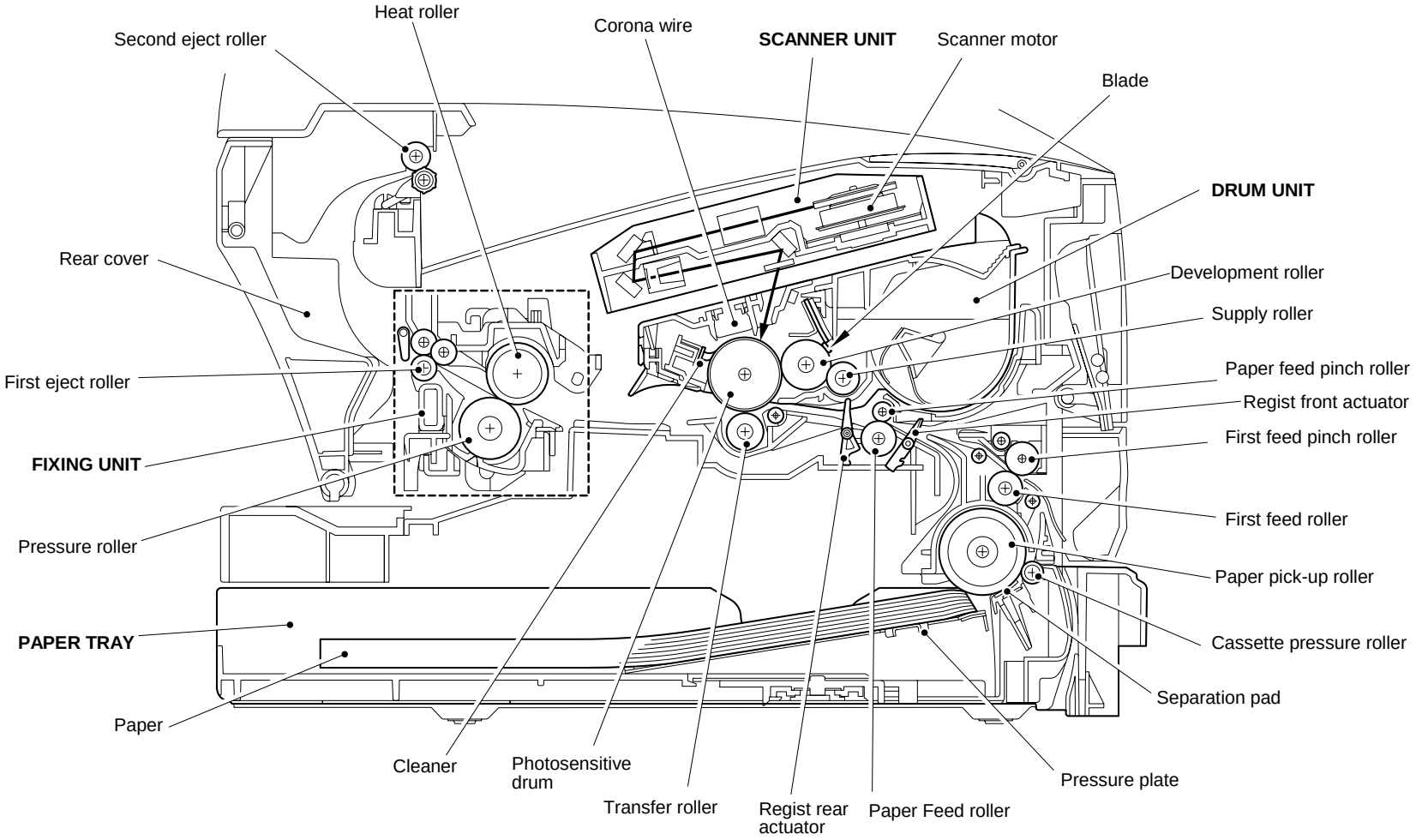


Fig. 3-19

2.2 Scanner Mechanism

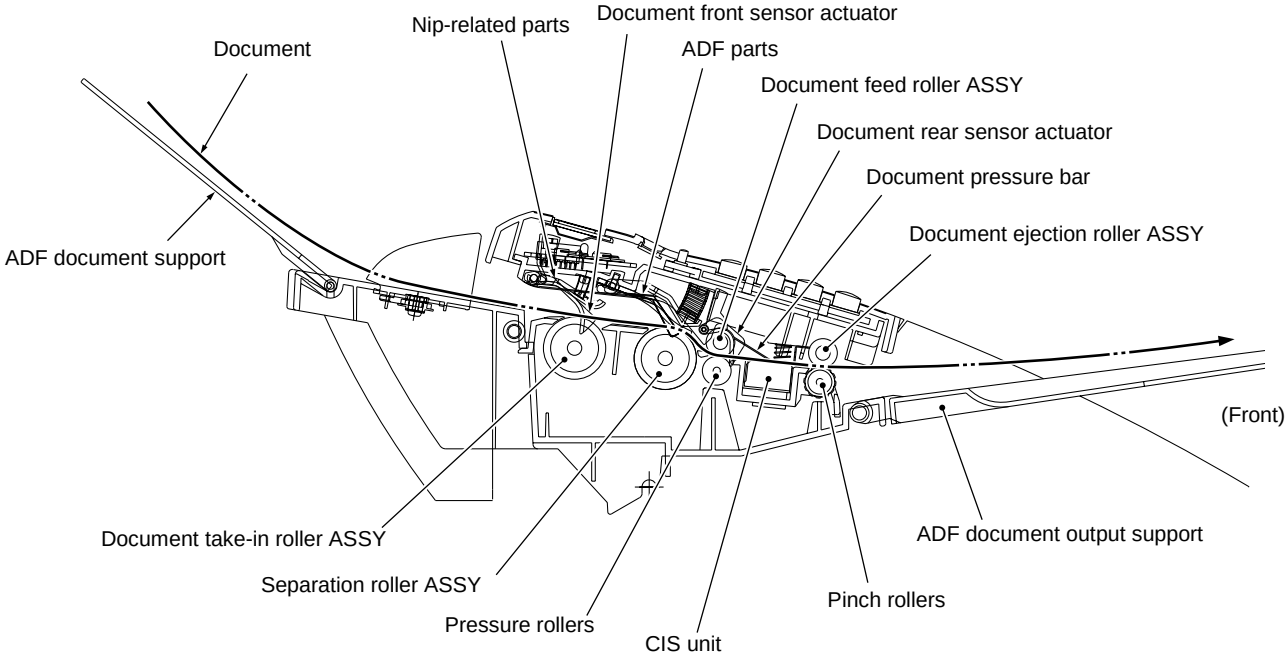


Fig. 3-20

2.2.1 Document feeding and ejecting mechanism

This mechanism consists of the ADF document support, automatic document feeder (ADF), document ejection roller ASSY, and document sensors. (For details about the sensors, refer to Section 2.4.)

If you set documents on the ADF document support with their faces down and start scanning operation, then the scanner motor rotates so that the ADF (which consists of the document take-in roller ASSY, nip-related parts, separation roller ASSY, and ADF parts) feeds those documents into the equipment, starting from the bottom sheet (first page) to the top (last page), page by page. Each document advances with the document feed roller ASSY to the scanner, and then it is fed out of the equipment with the document ejection roller ASSY.

2.2.2 Scanner

The scanner uses a contact image sensor (CIS) unit which consists of an LED array illuminating documents, a self-focus lens array collecting the reflected light, a CIS PCB carrying out photoelectric conversion to output picture element data, and a cover glass on which a document advance. When the document passes between the document pressure bar and the cover glass, it is scanned.

2.3 Paper Transfer

2.3.1 Paper supply

The paper pick-up roller picks up one sheet of paper from the paper tray every time it is rotated and feeds it to the paper feed roller.

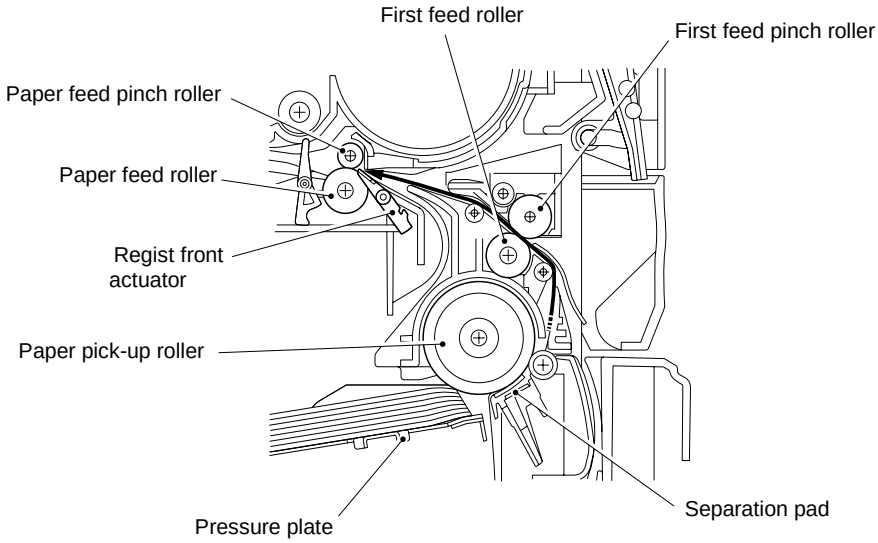


Fig. 3-21

The paper is gripped between the paper pick-up roller and the separation pad and separated into individual sheets.

The pick-up roller is directly connected to the clutch mechanism, whose rotation is stopped by the stopper arm. When the pick-up solenoid is activated, the clutch mechanism is engaged by the solenoid action and the paper pick-up roller is driven. The paper drawn out of the tray by the pick-up roller pushes against the regist front actuator and the paper top position/absence of paper is detected by sensing the motion of the actuator.

2.3.2 Paper registration

After the paper top position is detected by the regist front actuator, the paper, separated into individual sheets by the paper pick-up roller, is fed further for a specified time, and the paper top position reaches the paper feed roller so that the paper skew is adjusted. Then, the solenoid is turned off, the paper feed roller starts turning, and the paper is fed to the transfer block in the drum unit.

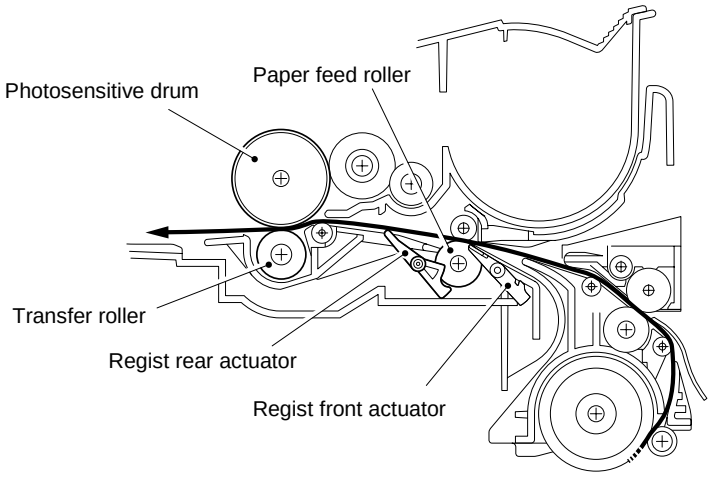


Fig. 3-22

The regist rear actuator in the path from the feed roller to the transfer roller controls the first print position on the paper.

2.3.3 Paper eject

After the printing image on the photosensitive drum is transferred onto the paper, the paper is fed to the fixing unit to fix unfixed toner onto the paper.

Afterwards, the paper is ejected from the fixing unit by the first eject roller in the fixing unit. The paper eject actuator detects whether the paper is ejected correctly or not.

After the paper exits from the first eject roller, the paper is turned by the rear cover and ejected face down into the top output tray through the second eject roller. If the rear cover is open, the paper is ejected face up straight to the printer rear (straight paper path).

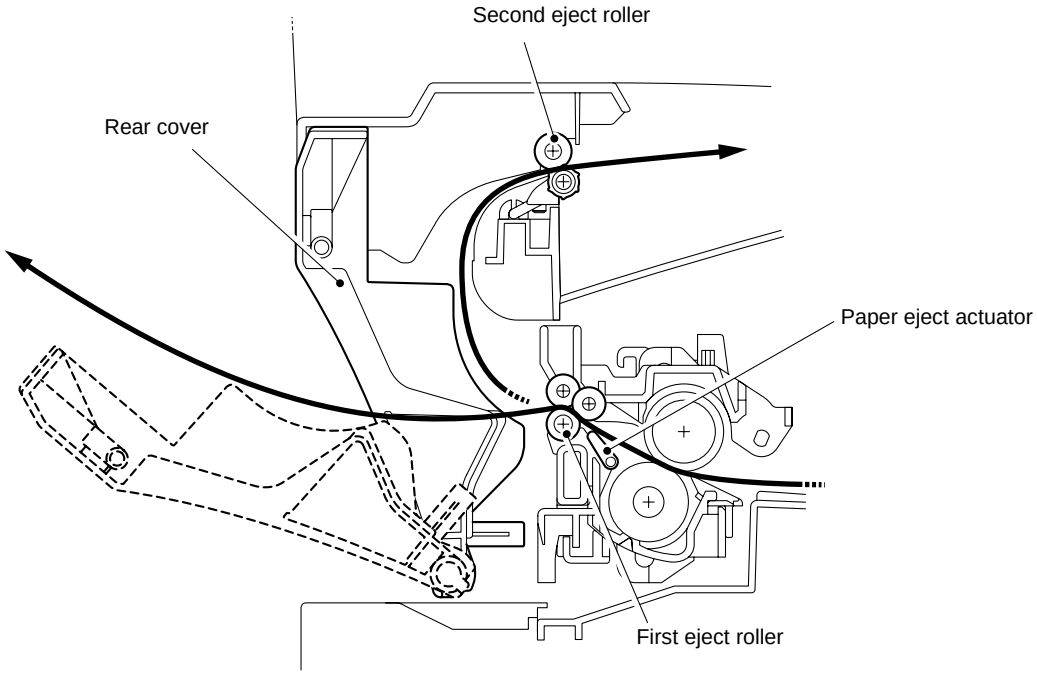


Fig. 3-23

2.4 Sensors

2.4.1 Document cover sensor

Detect opening and closing of the front cover.

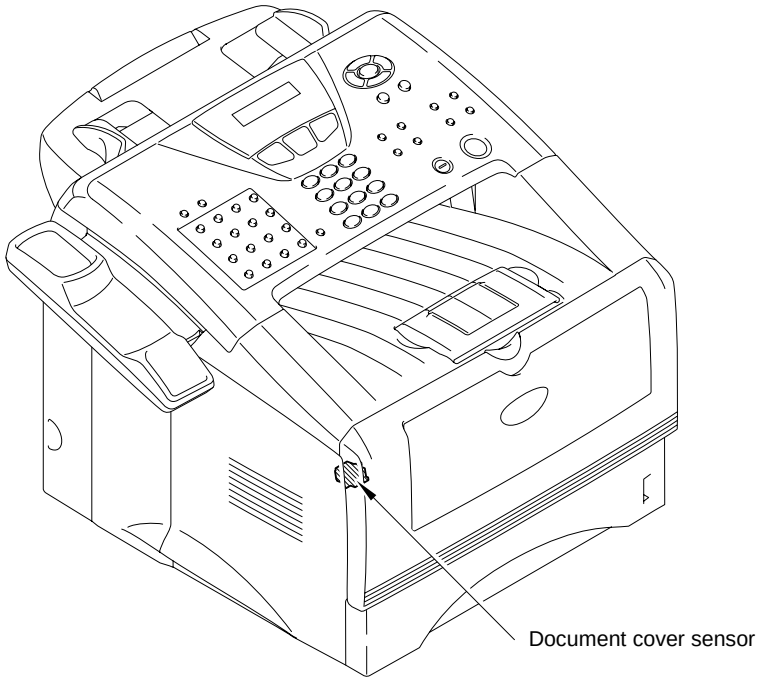


Fig. 3-24

2.4.2 Toner sensors

Detects if there is toner in the toner cartridge. The toner sensor at the left side emits light through the window on the left side of the toner cartridge, then the toner sensor at the right side receives it when the toner is low. They also detect whether or not the drum unit is installed. (The toner cartridge is installed in the drum unit.)

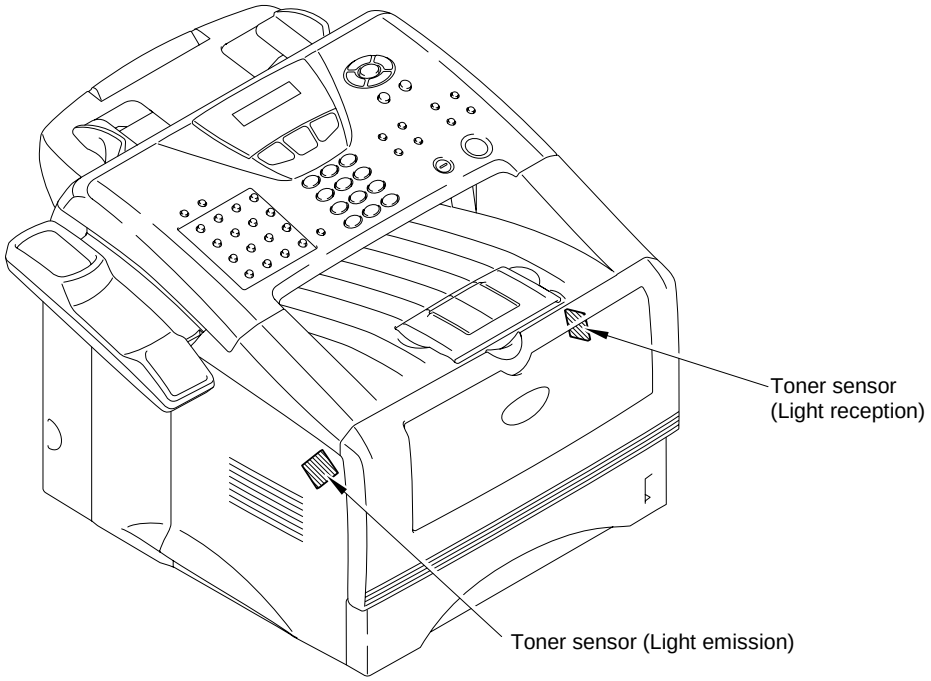


Fig. 3-25

2.4.3 Cassette sensor / Paper empty sensor

Detect if the paper tray is installed. They also detect if there is paper in the paper tray.

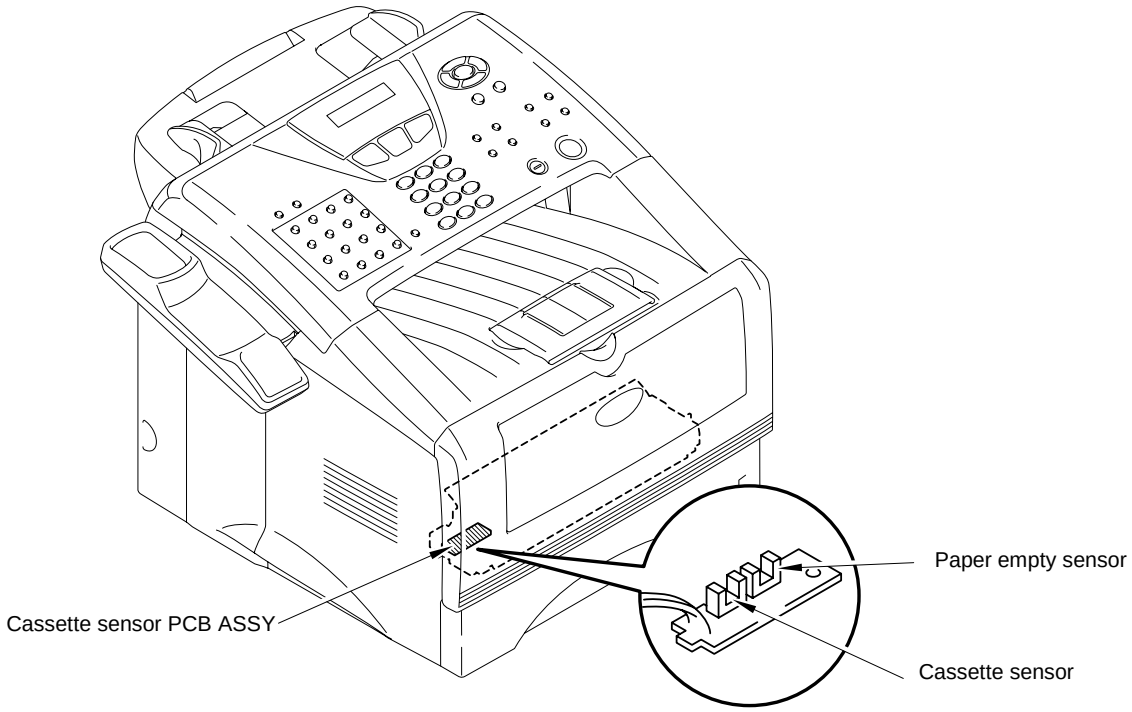


Fig. 3-26

2.4.4 Paper eject sensor

Detects if paper is ejected from the fixing unit.

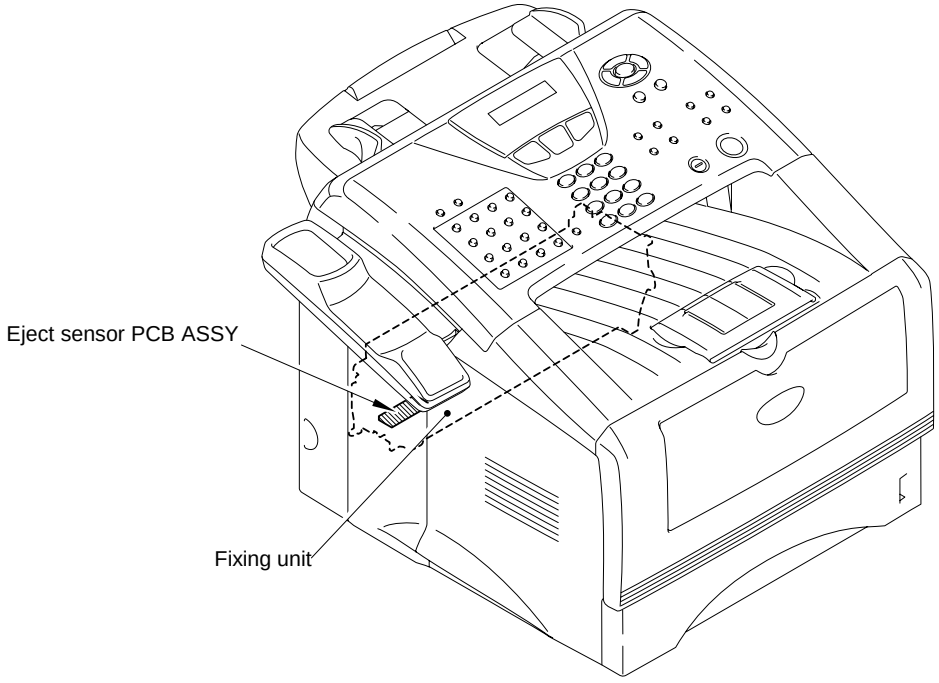


Fig. 3-27

2.4.5 Document front sensor /Document rear sensor

It detects that a document is placed on the ADF. (Document front sensor)
It detects that a document is finished to be fed. (Document rear sensor)

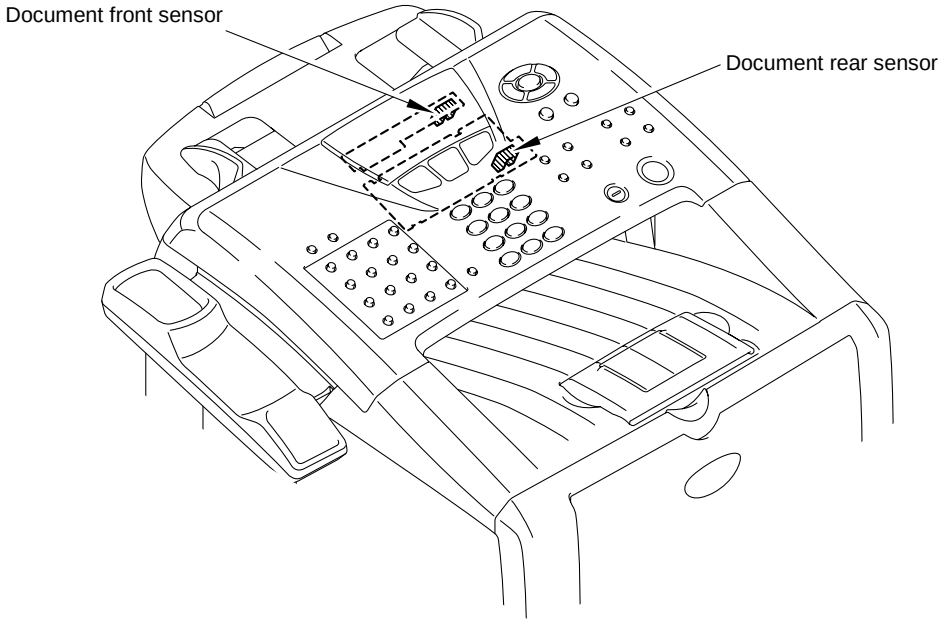


Fig. 3-28

2.4.6 Regist sensor

It detects whether paper is fed from the paper tray or the manual feed tray.

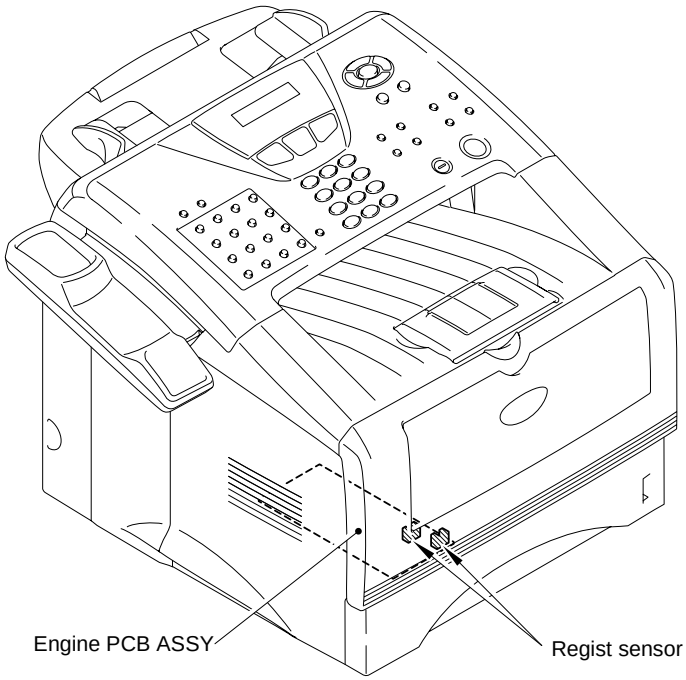


Fig. 3-29

2.5 Drum Unit

2.5.1 Photosensitive drum

Generates the latent electrostatic image and develops the image on the drum surface.

2.5.2 Primary charger

Forms a uniform charge on the drum surface.

(1) Corona wire
Generates the ion charge on the drum.

(2) Grid
Spreads the ion charge evenly over the drum surface.

2.5.3 Transfer roller

Transfers the toner image to the paper from the drum surface.

2.5.4 Cleaner

Removes the paper dust or dirt on the surface of the photosensitive drum.

2.6 Toner Cartridge

Develops the electrostatic latent image on the photosensitive drum with toner and forms the visible image.

2.7 Print Process

2.7.1 Charging

The drum is charged to approximately 870V by an ion charge which is generated by the primary charger. The charge is generated by ionization of the corona wire, which has a DC bias from the high-voltage power supply applied to it. The flow of the ion charge is controlled by the grid to ensure it is distributed evenly on the drum surface. The aluminum drum sleeve in the photosensitive drum is grounded.

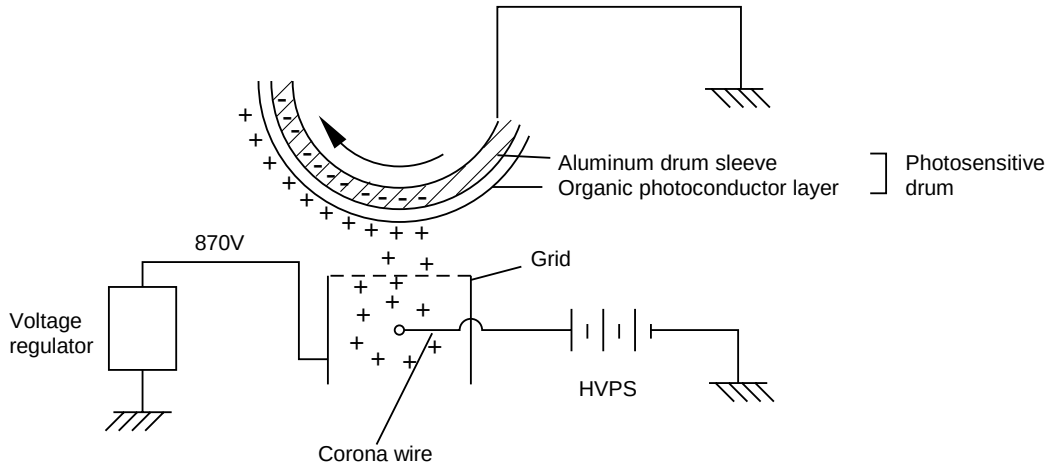


Fig. 3-30

The primary charge uses a corona wire, but since the drum is positively charged, only less than 1/10 of the usual quantity of ozone is generated compared with the negatively charged drum. The level of ozone expelled from the printer is therefore not harmful to the human body. Applicable safety standards have been complied with.

2.7.2 Exposure stage

After the drum is positively charged, it is exposed to the light emitted from the laser unit.

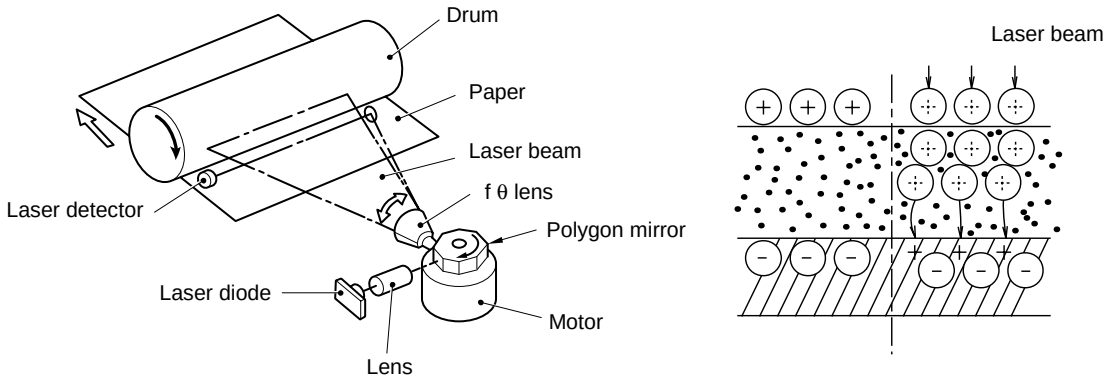


Fig. 3-31

The area exposed to the laser beam is the image to be printed. The surface potential of the exposed area is reduced, forming the electrostatic image to be printed.

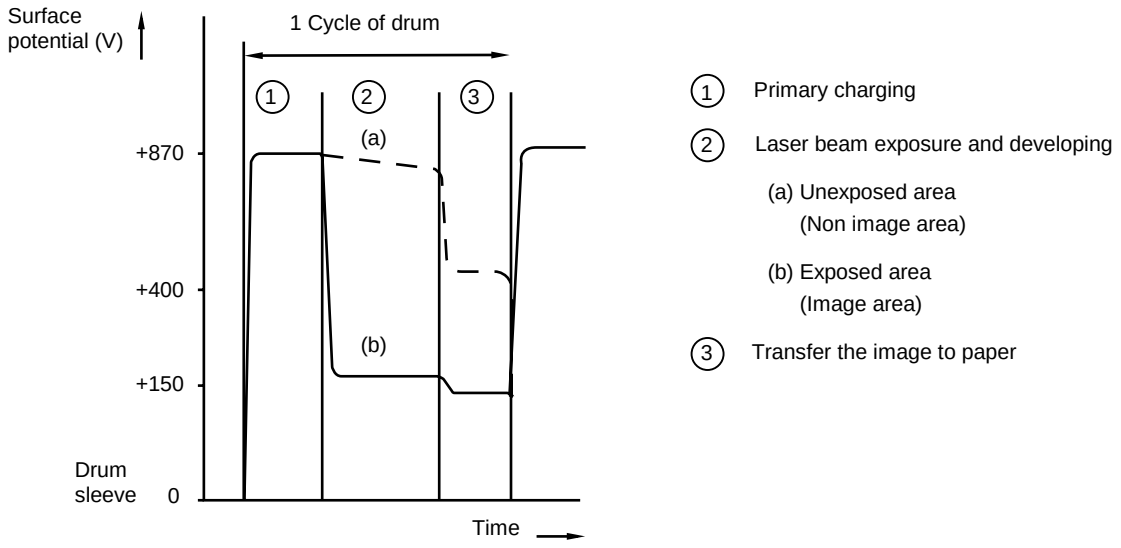


Fig. 3-32

2.7.3 Developing

Developing causes the toner to be attracted to the electrostatic image on the drum so as to transform it into a visible image.

The developer consists of a non-magnetic toner. The development roller is made of conductive rubber and the supply roller (which is also made of conductive sponge) rotate against each other. The toner is charged and carried from the supply roller to the development roller. The toner adheres to the development roller and is conveyed to the photosensitive drum at an even thickness controlled by the blade. The toner is nipped between the development roller and the drum and developed onto the latent image on the drum. The electrostatic field between the drum and the development roller, which is DC-biased from the high-voltage power supply, creates the electrostatic potential to attract toner particles from the development roller to the latent image area on the drum surface.

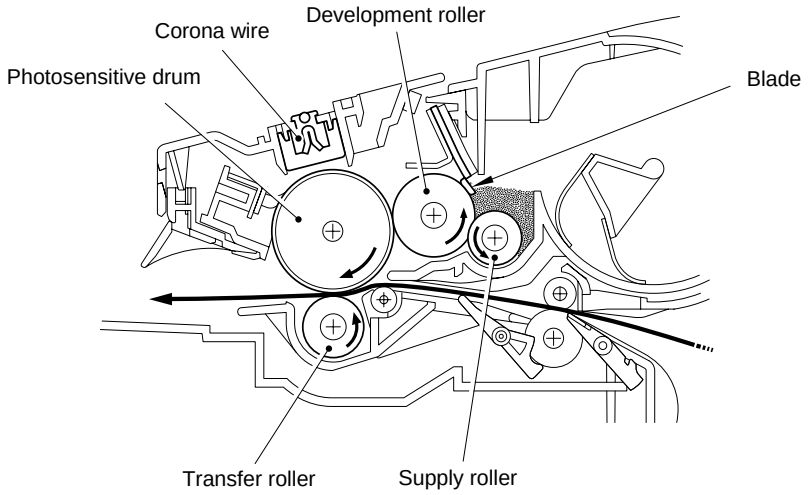


Fig. 3-33

2.7.4 Transfer

(1) Transfer process

After the drum has been charged and exposed, and has received a developed image, the toner formed is transferred onto the paper by applying a negative charge to the back of the paper. The negative charge applied to the paper causes the positively charged toner to leave the drum, and adhere to the paper. As a result, the image is visible on the paper.

(2) Cleaning process of transfer roller

If the toner is not transferred onto the paper perfectly it is possible that there may be residual toner on the drum which will adhere to the transfer roller. The transfer voltage changes to a positive voltage during non-printing rotation of the drum. Therefore the transfer roller is cleaned by returning the positively charged toner adhering to the transfer roller onto the photo-conductive drum.

2.7.5 Fixing stage

The image transferred to the paper by static electricity is fixed by heat and pressure when passing through the heat roller and the pressure roller in the fixing unit. The thermistor keeps the surface temperature of the heat roller constant by detecting the surface temperature of the heat roller and turning on or off the halogen heater lamp.

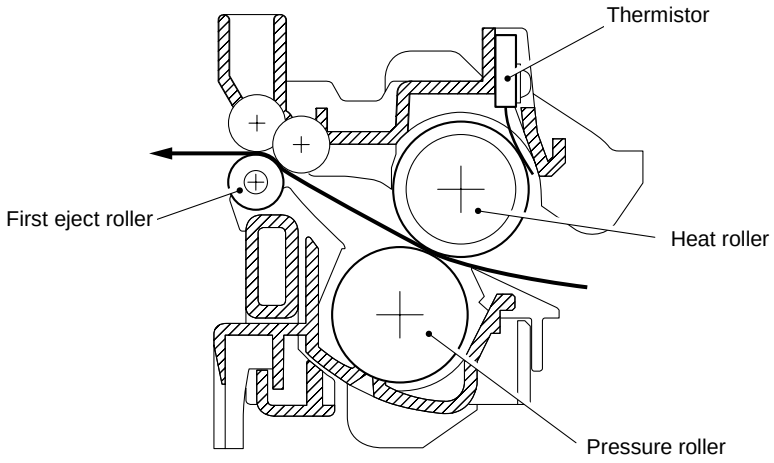


Fig. 3-34

CHAPTER 4 DISASSEMBLY AND RE-ASSEMBLY

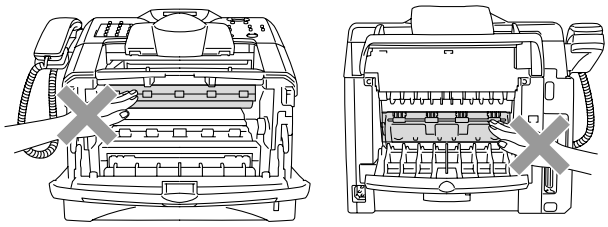
1. SAFETY PRECAUTIONS

To avoid creating secondary problems by mishandling, follow the warnings and precautions below during maintenance work.

WARNING

(1) Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.

(2) Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the red colored parts shown in the following figures.



CAUTION:

(1) Be careful not to lose screws, washers, or other parts removed.

(2) Be sure to apply grease to the gears and applicable positions specified in this chapter.

(3) When using soldering irons or other heat-generating tools, take care not to accidentally damage parts such as wires, PCBs and covers.

(4) Before handling any PCBs, touch a metal portion of the equipment to discharge any static electricity charge on your body, or the electronic parts or components may be damaged.

(5) When transporting PCBs, be sure to wrap them in the correct protective packaging.

(6) Be sure to replace self-tapping screws correctly, if removed. Unless otherwise specified, tighten screws to the following torque values.

TAPTITE, BIND or CUP B
M3: 0.7N • m
M4: 0.8N • m

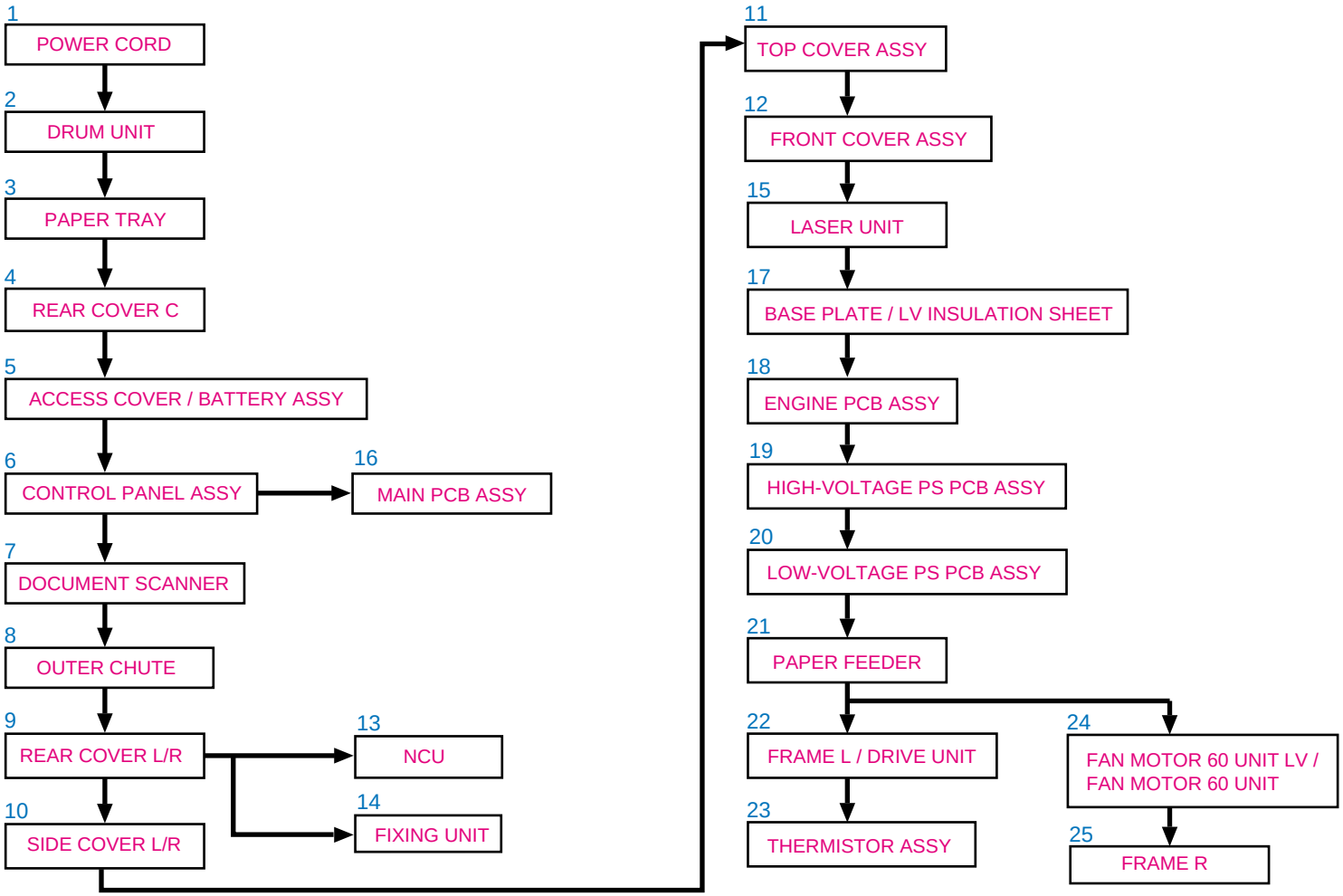
TAPTITE, CUP S
M3: 0.8N • m

SCREW
M3: 0.7N • m
M4: 0.8N • m

(7) When connecting or disconnecting cable connectors, hold the connector body, not the cables. If the connector has a lock, release the connector lock first to release it.

(8) After a repair, check not only the repaired portion but also all connectors. Also check that other related portions are functioning properly before operational checks.

2. DISASSEMBLY FLOW



3. DISASSEMBLY PROCEDURE

3.1 Power Cord

(1) Disconnect the power cord from the machine.

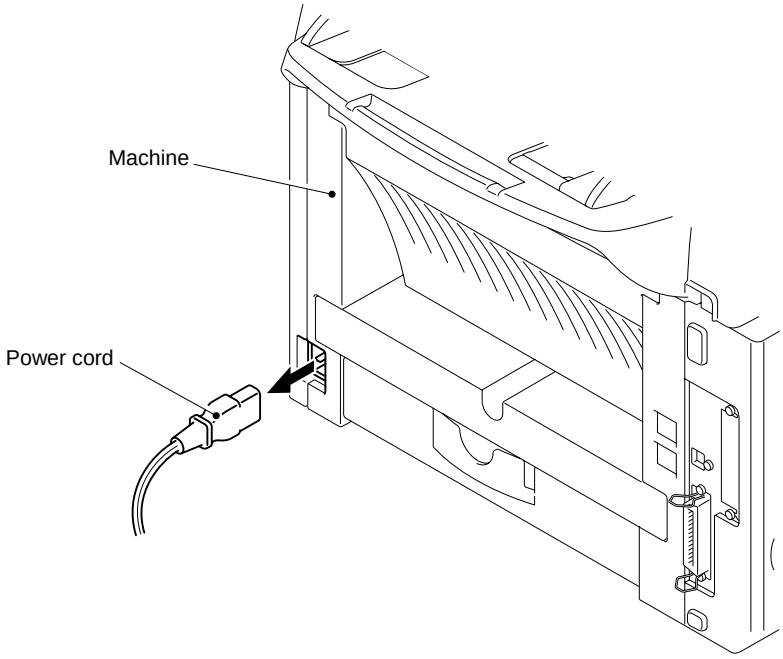


Fig. 4-1

3.2 Drum Unit

(1) Open the front cover ASSY and remove the drum unit.

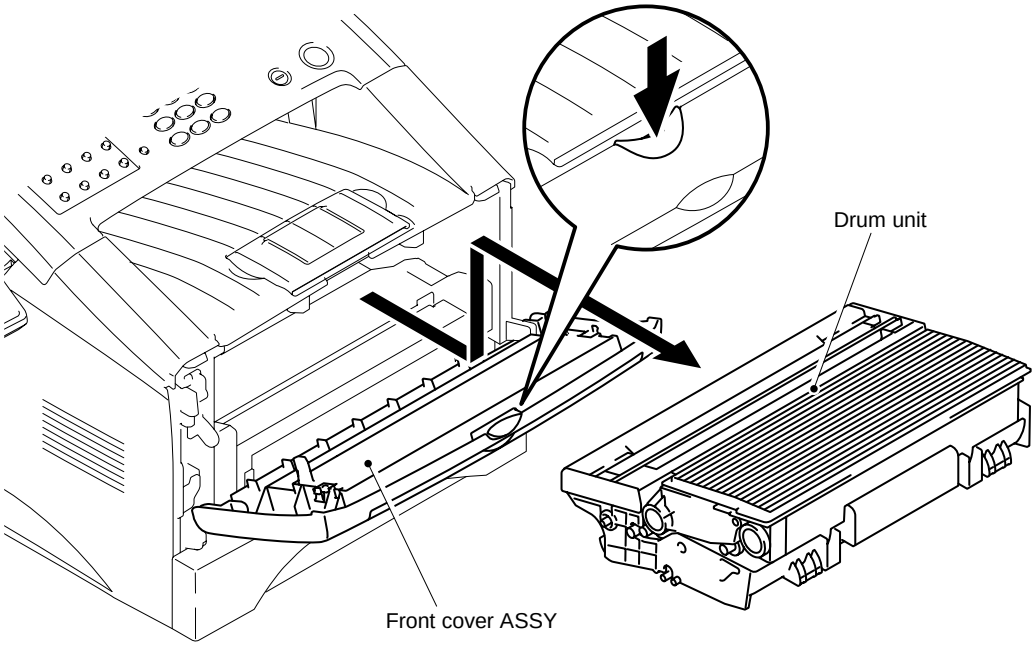


Fig. 4-2

3.3 Paper Tray

(1) Close the front cover ASSY and pull out the paper tray.

(2) Remove the paper from the paper tray.

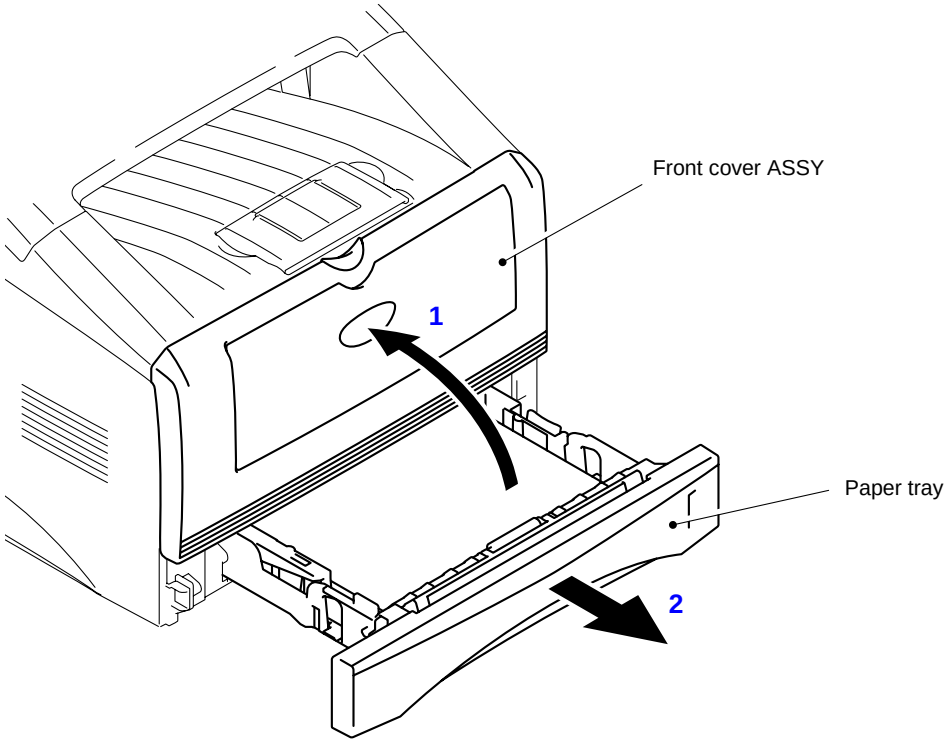


Fig. 4-3

(3) Remove the pad holder and the separation pad spring from the paper tray.

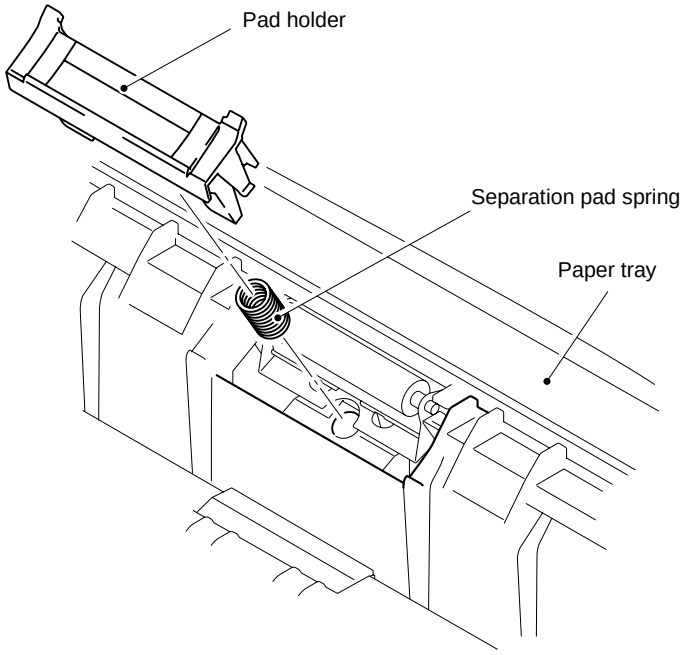


Fig. 4-4

NOTE:

When replacing/re-assembling the pad holder ZL2 ASSY, remove the old grease and apply a suitable amount of grease referring to the figure below;

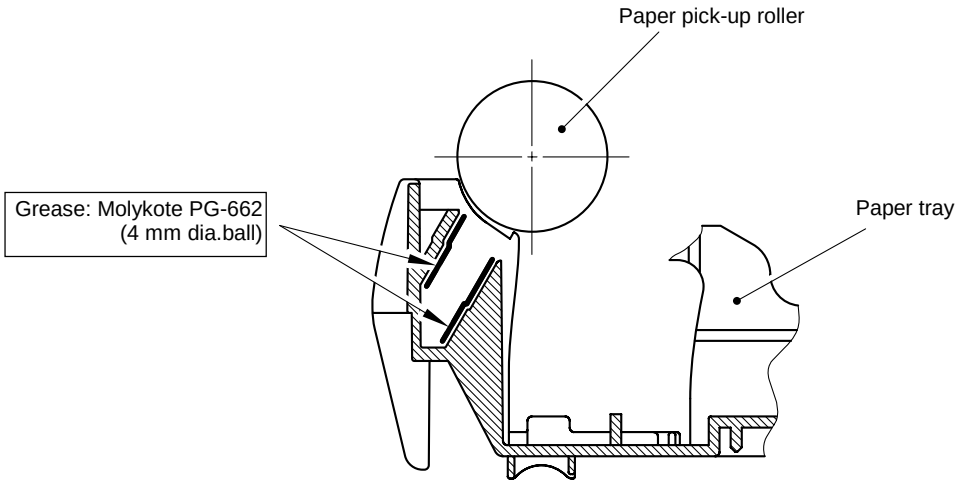


Fig. 4-5

(4) Remove the four bind B M4x12 Taptite screws, and then remove the paper tray front cover.

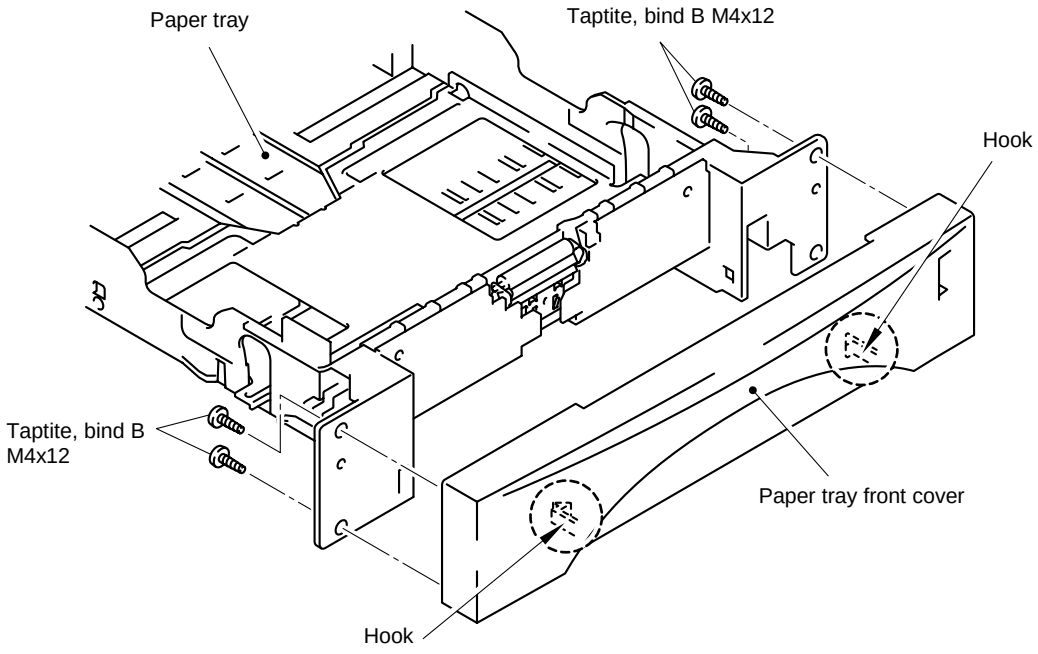


Fig. 4-6

(5) Remove the two cup B M3x10 Taptite screws, and then remove the paper tray cover.

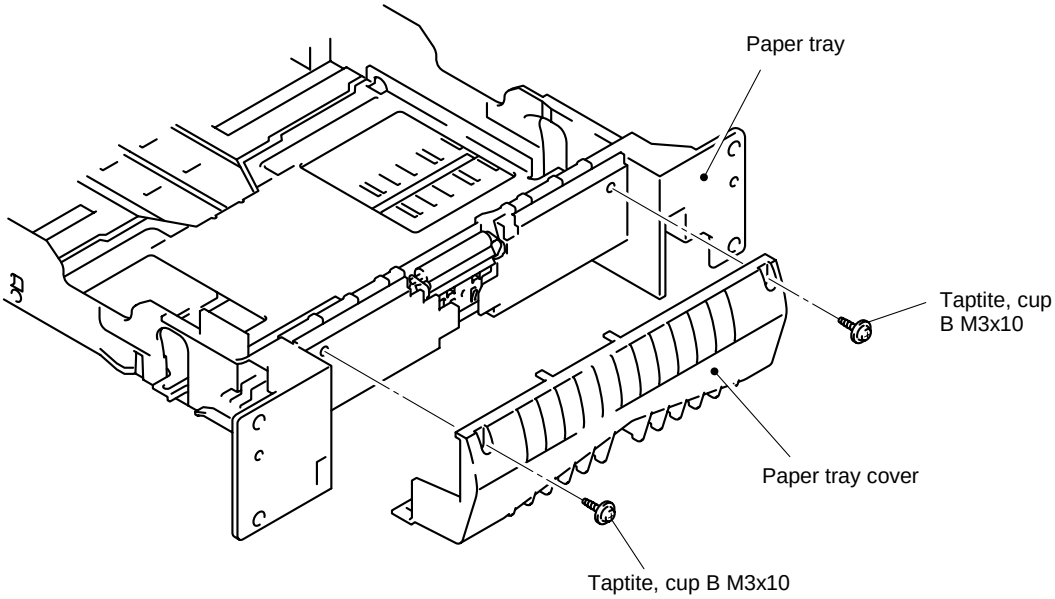


Fig. 4-7

(6) Remove the pressure roller holder ASSY.

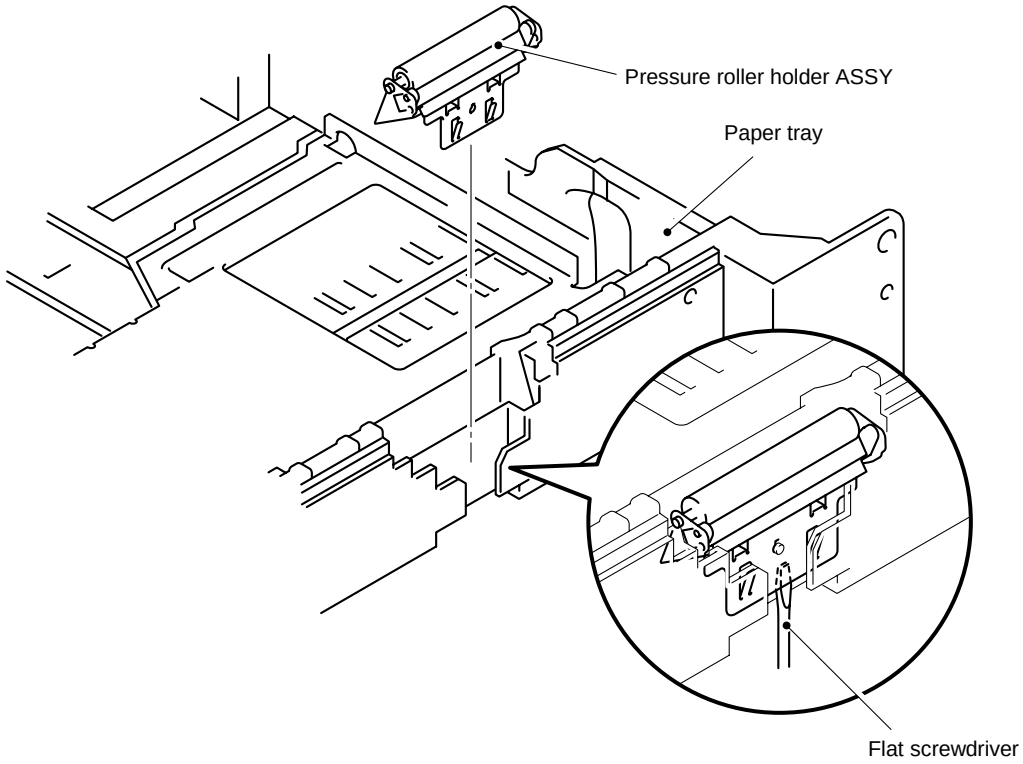


Fig. 4-8

(7) Remove the pressure roller collar.

(8) Remove the pressure roller shaft.

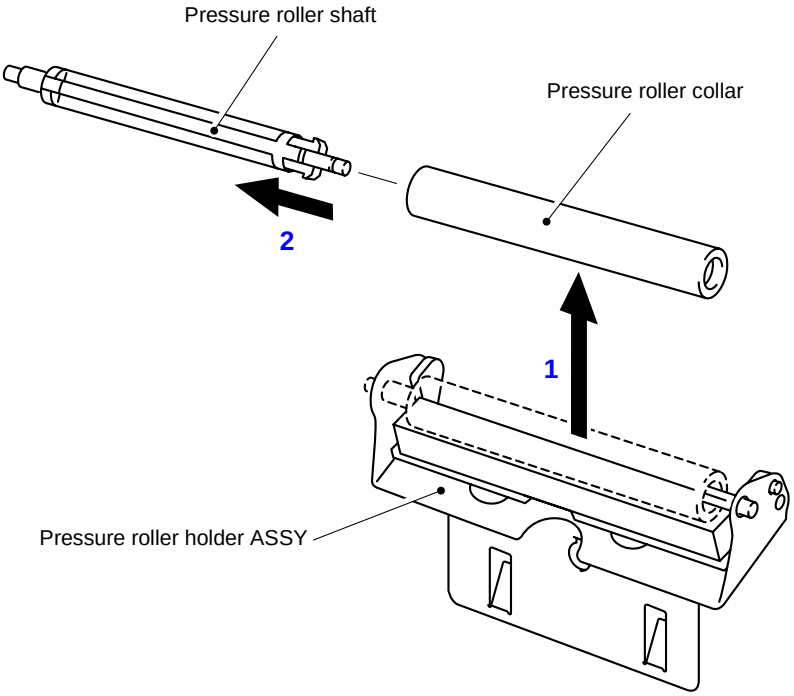


Fig. 4-9

(9) Remove the scratch spongy holder ASSY from the pressure roller holder ASSY.

(10) Remove the two scratch spongy springs.

(11) Remove the scratch spongy from the scratch spongy holder ASSY.

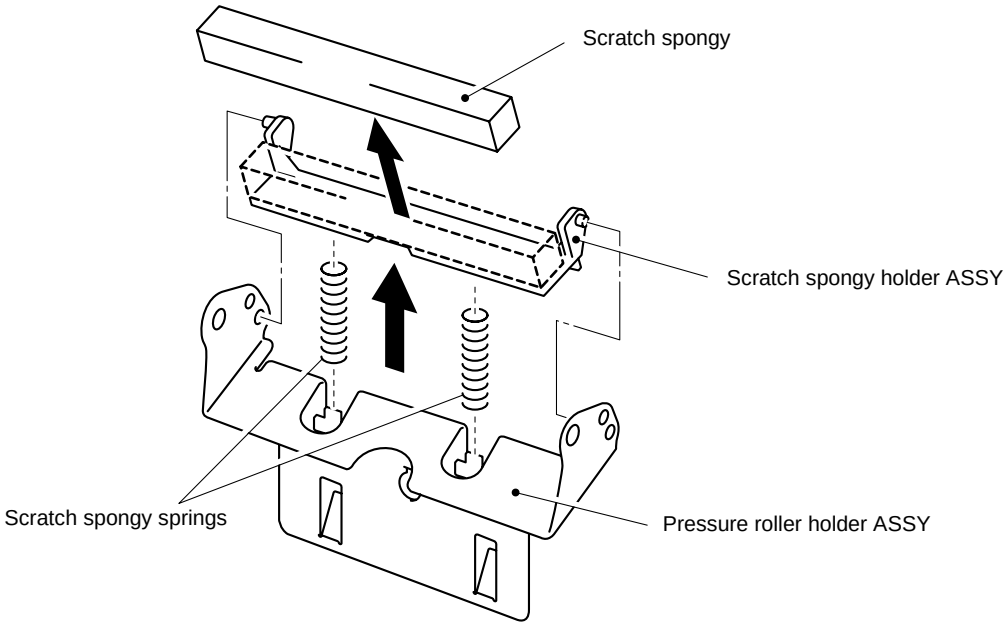


Fig. 4-10

(12) Remove the two cup B M2.6x5 Taptite screws.

(13) Release the lock of the pressing plate using the lock lever, and then disengage the catches of the side guides R and L from the side guide rack.

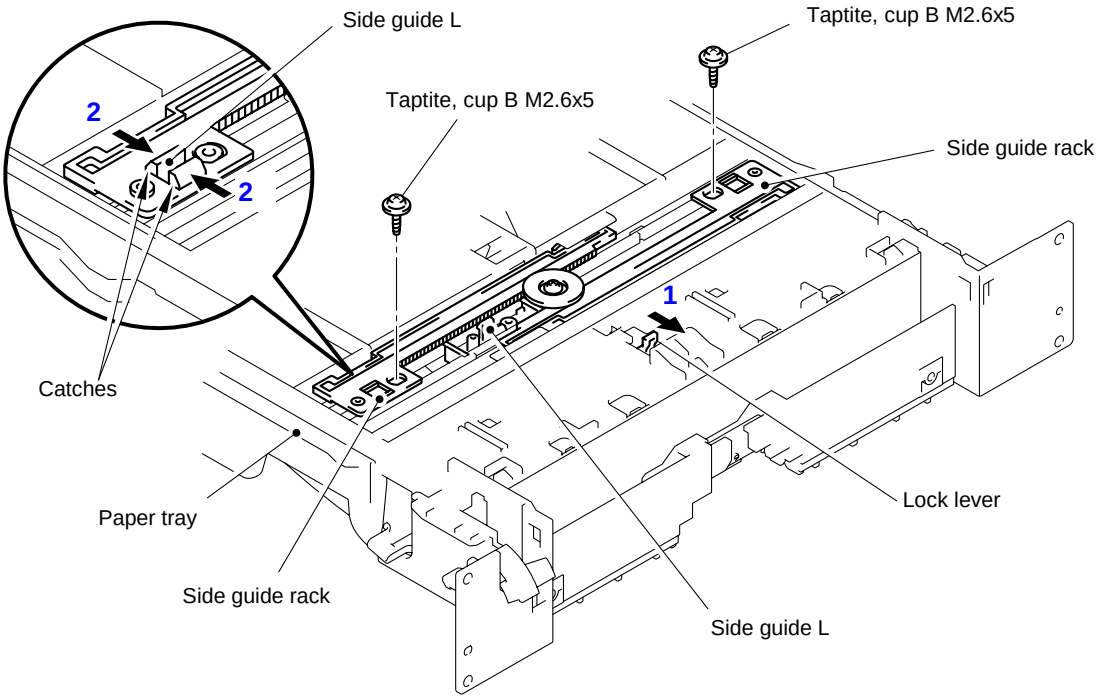


Fig. 4-11

(14) Remove the side guides right and left from the paper tray.

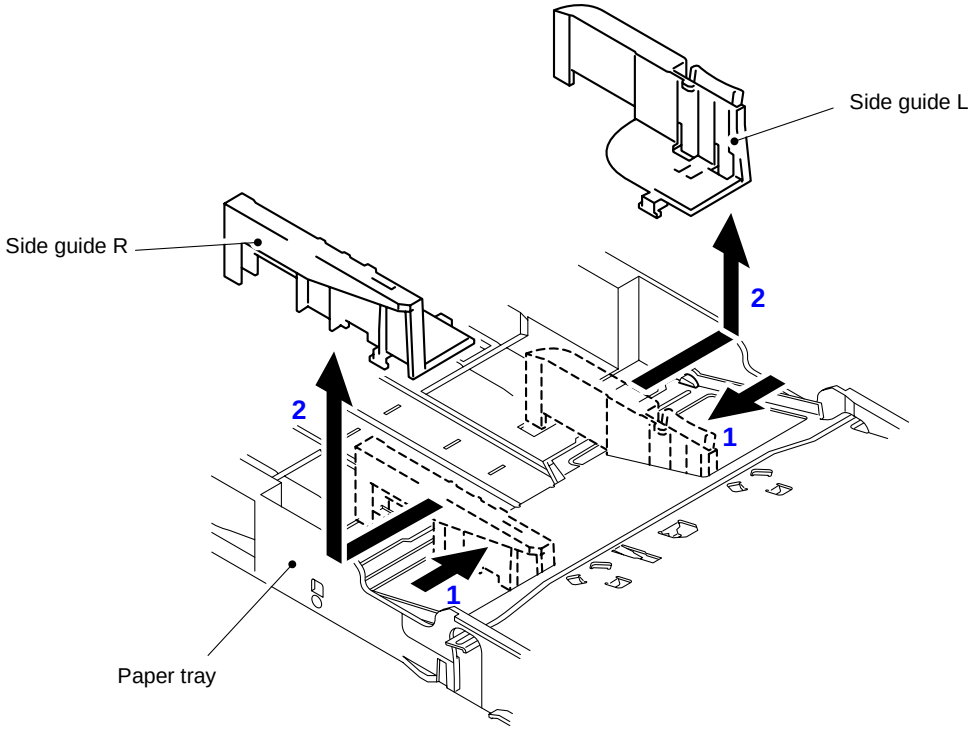


Fig. 4-12

(15) Unhook the two catches (A) of the pressure plate while pulling the plastic frame outwards, then unhook the other two catches (B) of the plate while pulling the plastic frame outwards to remove the pressure plate ASSY.

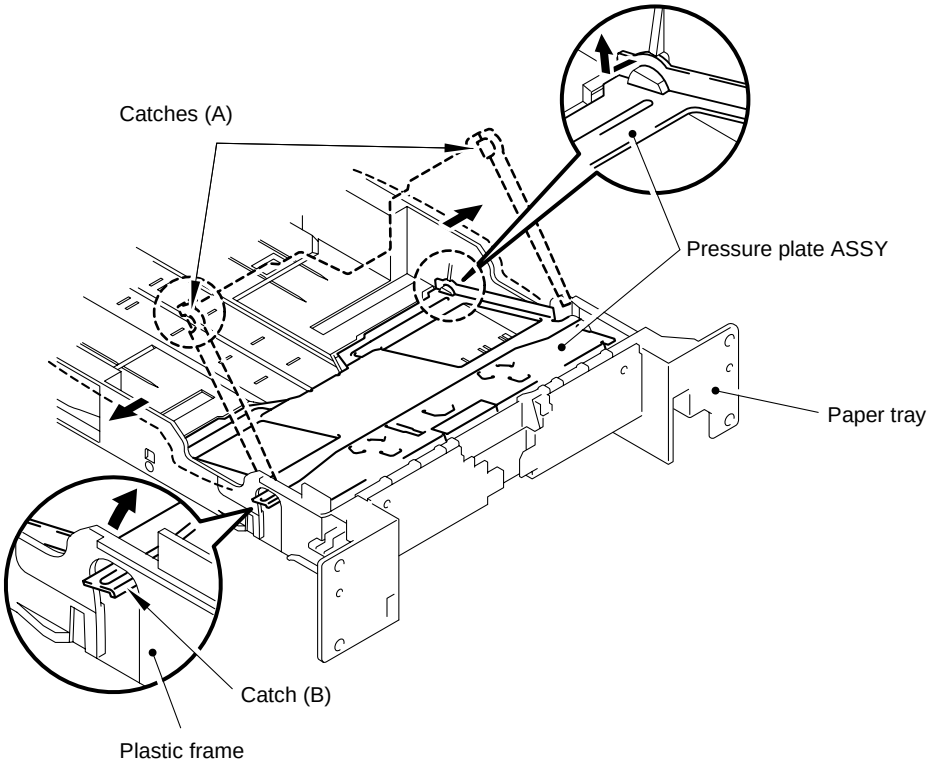


Fig. 4-13

(16) Unhook the pressure plate spring from the plastic hook to remove the two pressure plate springs.

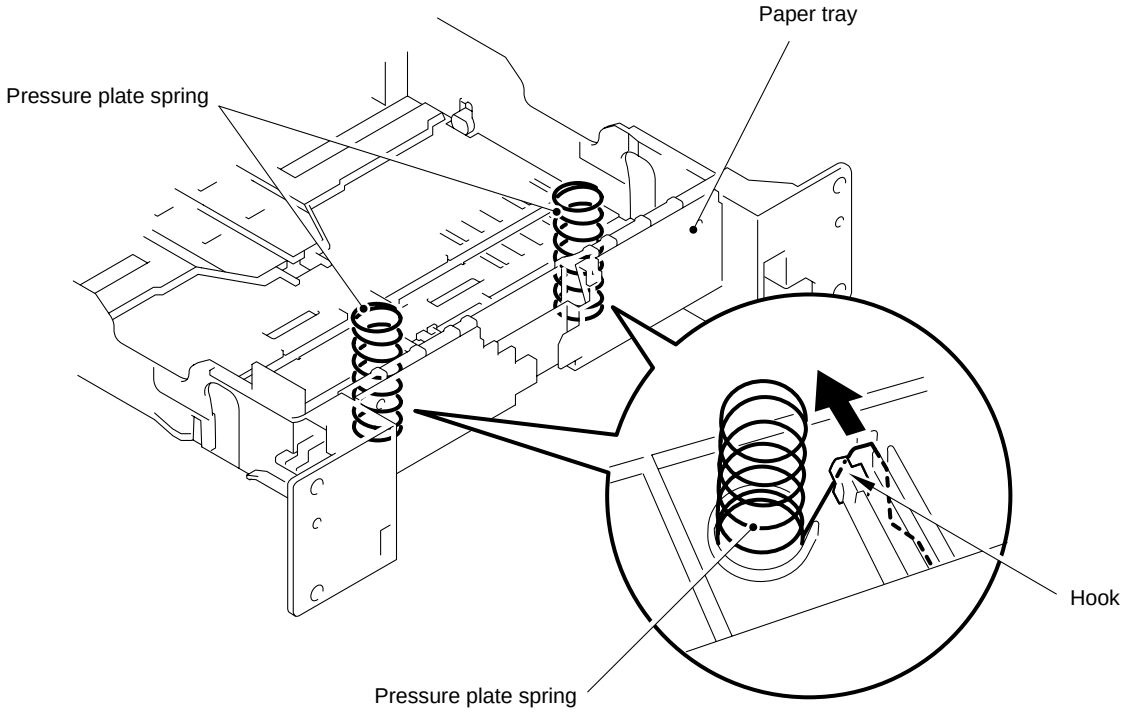


Fig. 4-14

NOTE:

When re-assembling the pressure plate ASSY, ensure that the paper indicator arm is under the pressure plate.

> ***CAUTION:***
> *When unhooking the catches to remove the pressure plate, do not bend the pressure plate, gently ease the plastic cover. If the pressure plate is deformed, paper feeding problems may occur.*

(17) Remove the herical extension spring.

(18) Remove the lock lever.

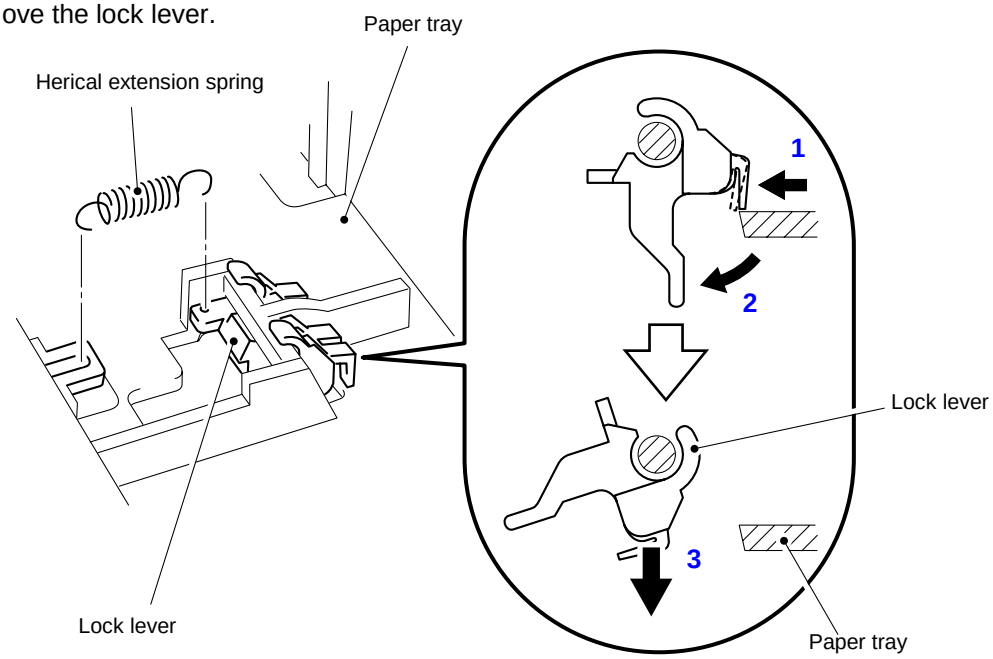


Fig. 4-15

NOTE:

When re-assembling the lock lever, insert it upwards from underneath the cassette and rotate it until the two catches lock into place.

(19) Remove the cup B M3x8 Taptite screw, and then remove the side guide gear and the friction spring.

(20) Remove the two side guide racks.

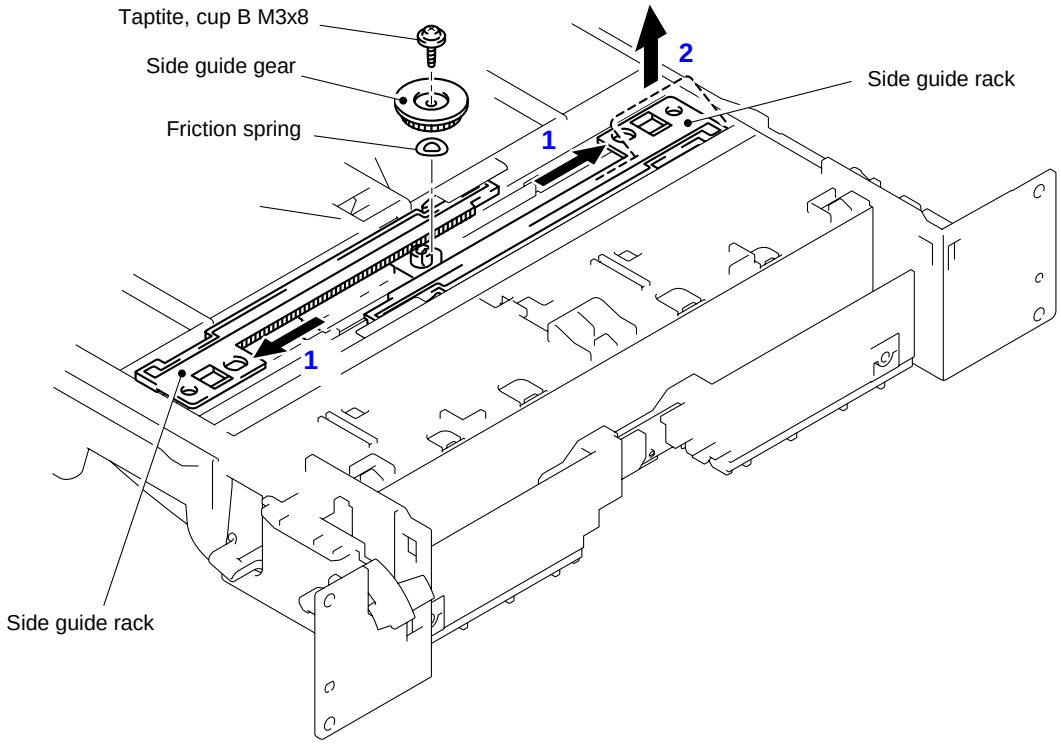


Fig. 4-16

(21) Remove the paper indicator.

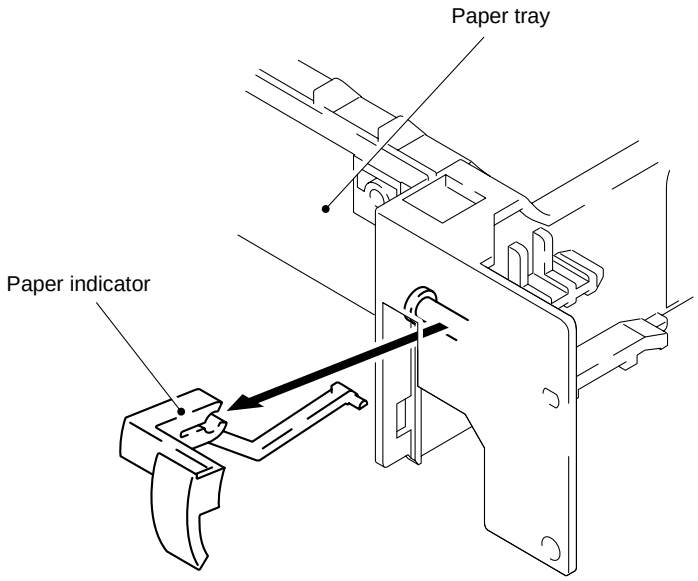


Fig. 4-17

NOTE:

- *When re-assembling the side guide racks, they should both be aligned so that the wide end of the racks are in line with the inside edge of the paper guide release slots in the tray before refitting the spring and gear.*
- *When replacing/re-assembling the paper tray, remove the old grease and apply a suitable amount of grease onto both sides of the paper tray referring to the figure below;*

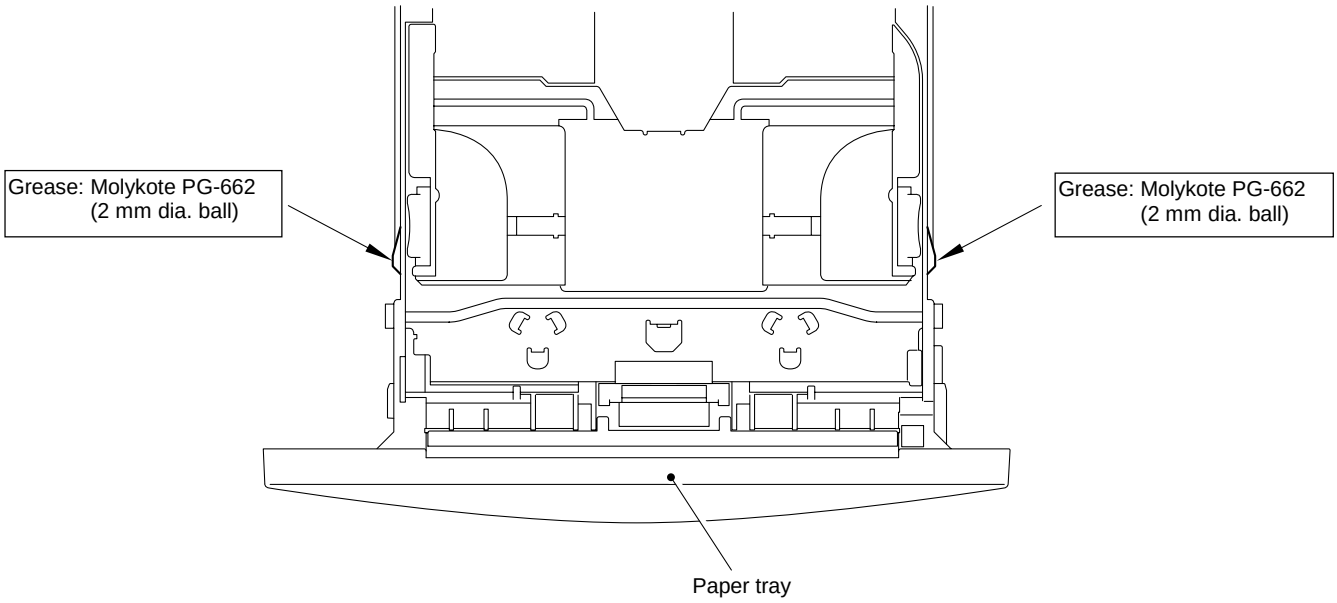


Fig. 4-18

(22) Remove the pan B M3x8 Taptite screw, and then remove the tray lock lever.

(23) Release the four hooks to remove the paper tray rear from the paper tray.

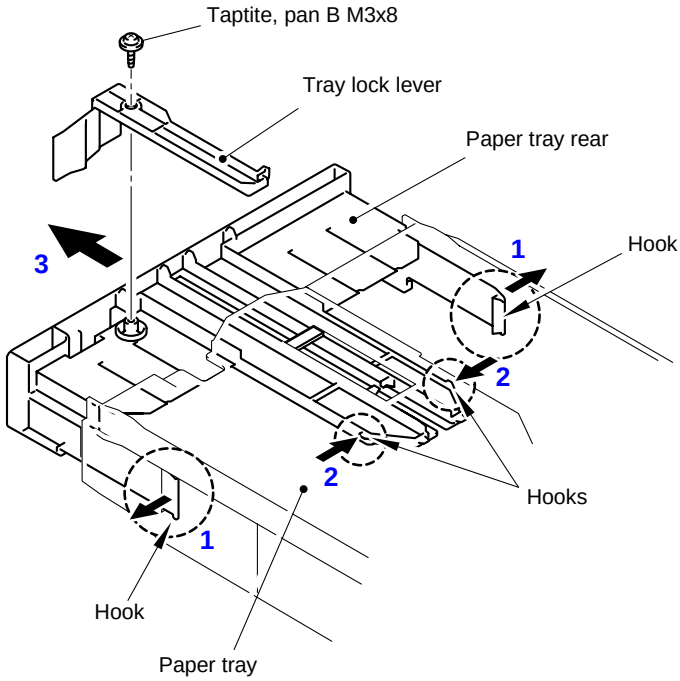


Fig. 4-19

(24) Remove the paper rear guide.

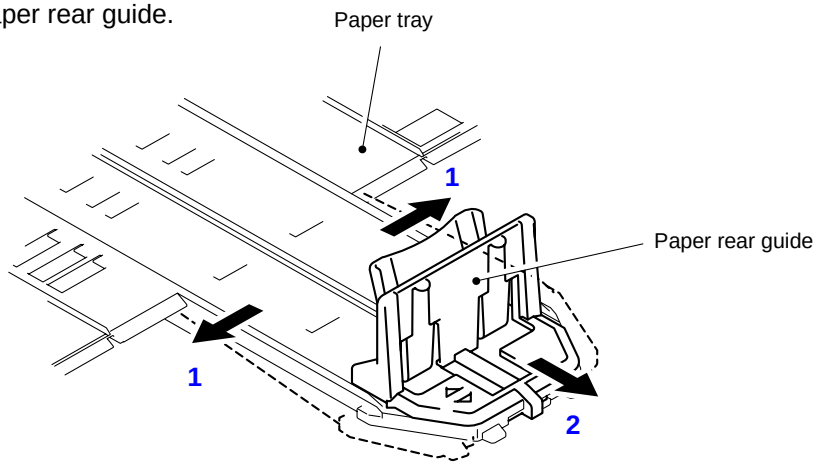


Fig. 4-20

3.4 Rear Cover C

(1) Remove the bind B M4x12 Taptite screw, and then remove the rear cover C.

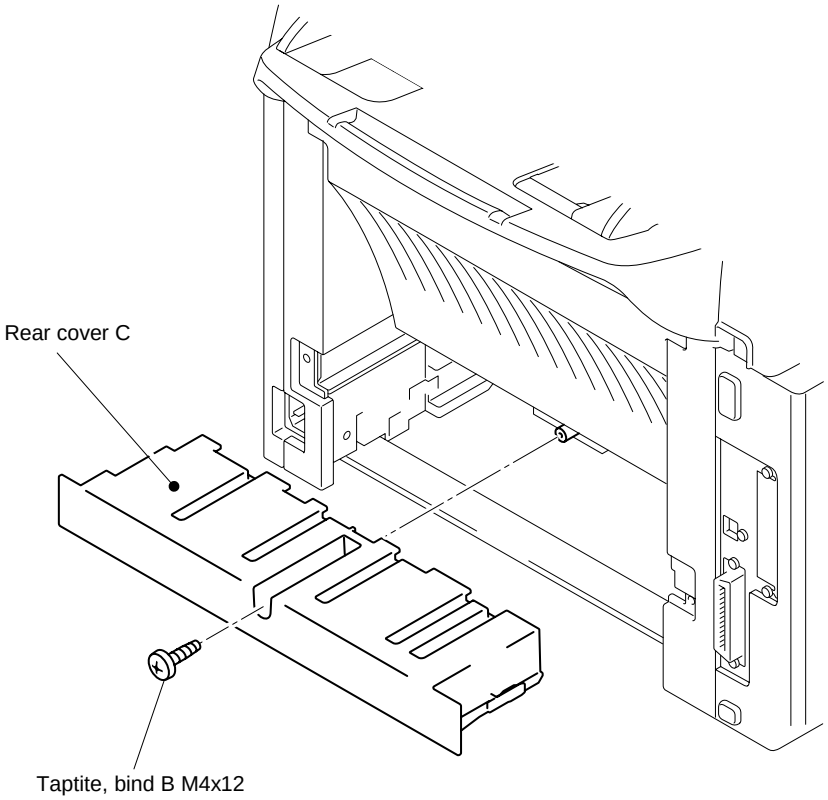


Fig. 4-21

3.5 Access Cover / Battery ASSY

(1) Remove the access cover.

(2) Loosen the two access plate screws.

(3) Remove the access plate.

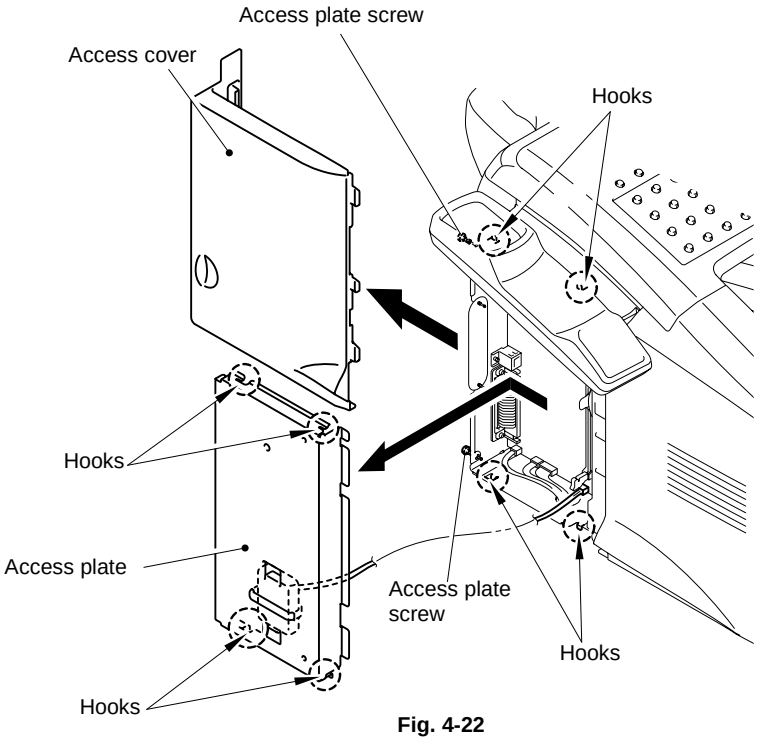


Fig. 4-22

(4) Disconnect the connector of the battery ASSY.

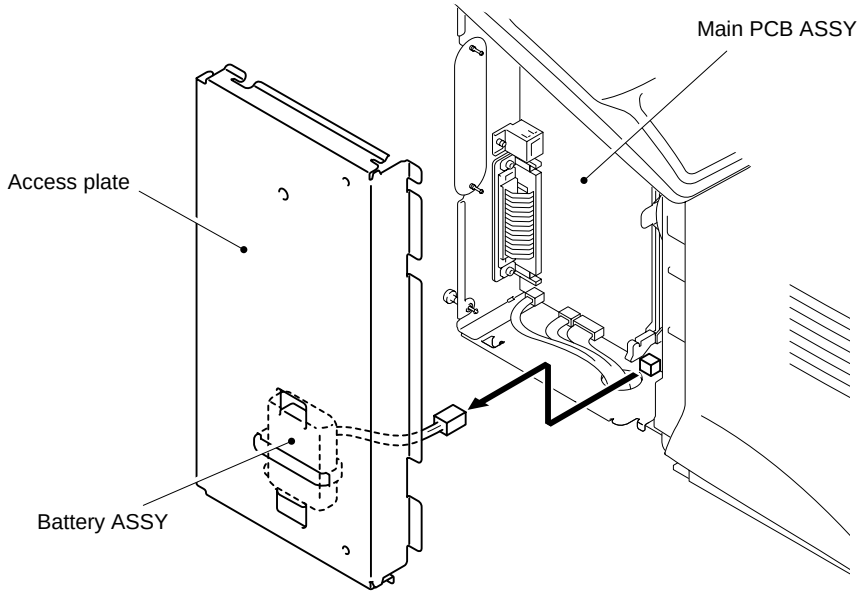


Fig. 4-23

(5) Cut the binding band which secures the battery ASSY to the access plate, and then remove the battery ASSY.

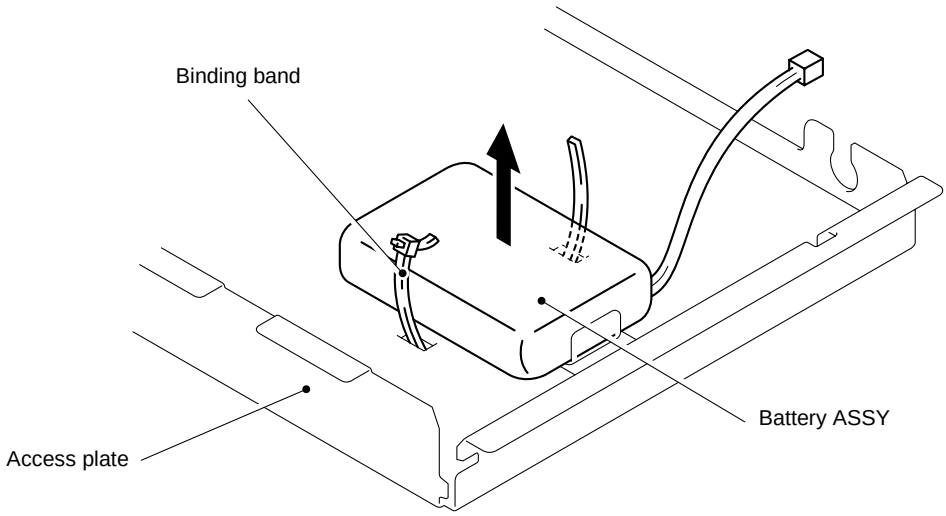


Fig. 4-24

3.6 Control Panel ASSY

(1) Remove the two pins, and then remove the control panel ASSY.

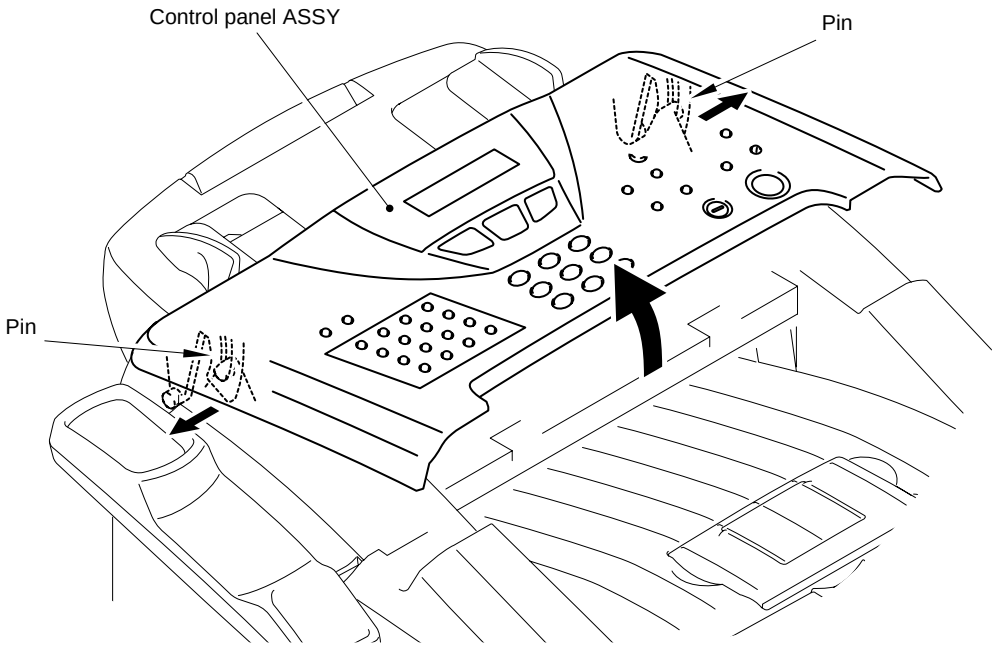


Fig. 4-25

(2) Disconnect the connector from the control panel ASSY.

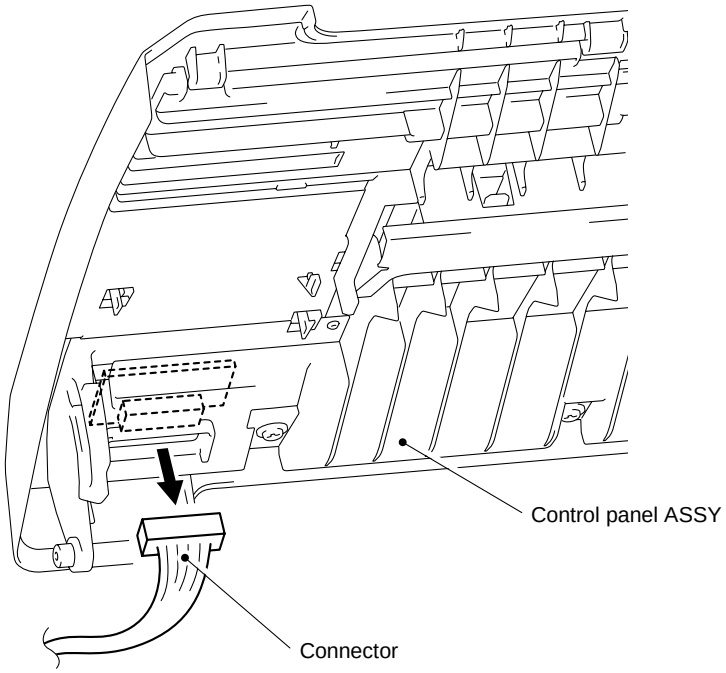


Fig. 4-26

(3) Remove the cup B M3x6 Taptite screw, and then remove the spring plate, ADF front.

(4) Remove the separation rubber, rubber holder and rubber holder spring.

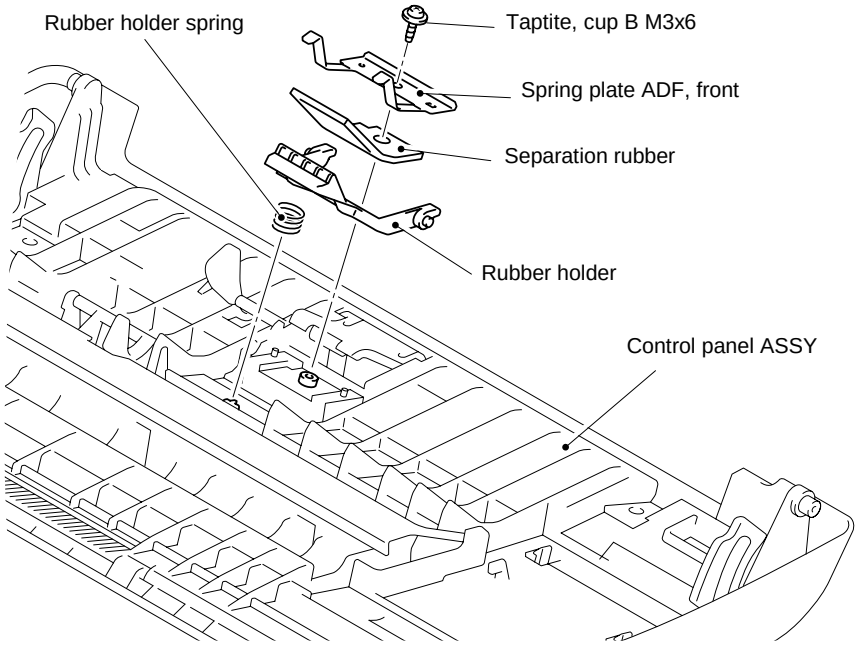


Fig. 4-27

(5) Remove the actuator R.

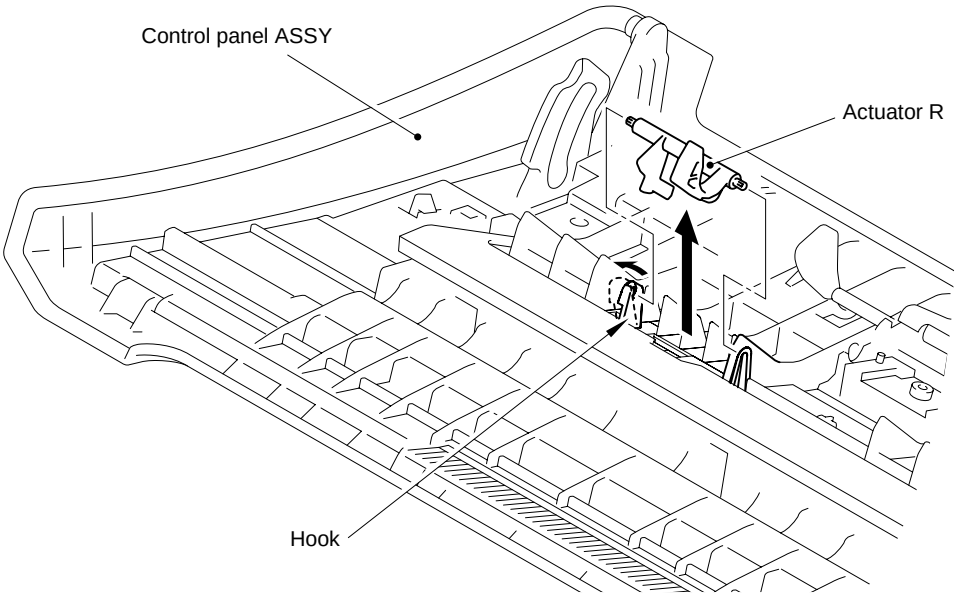


Fig. 4-28

(6) Open the right and left bosses, and then remove the document hold ASSY.

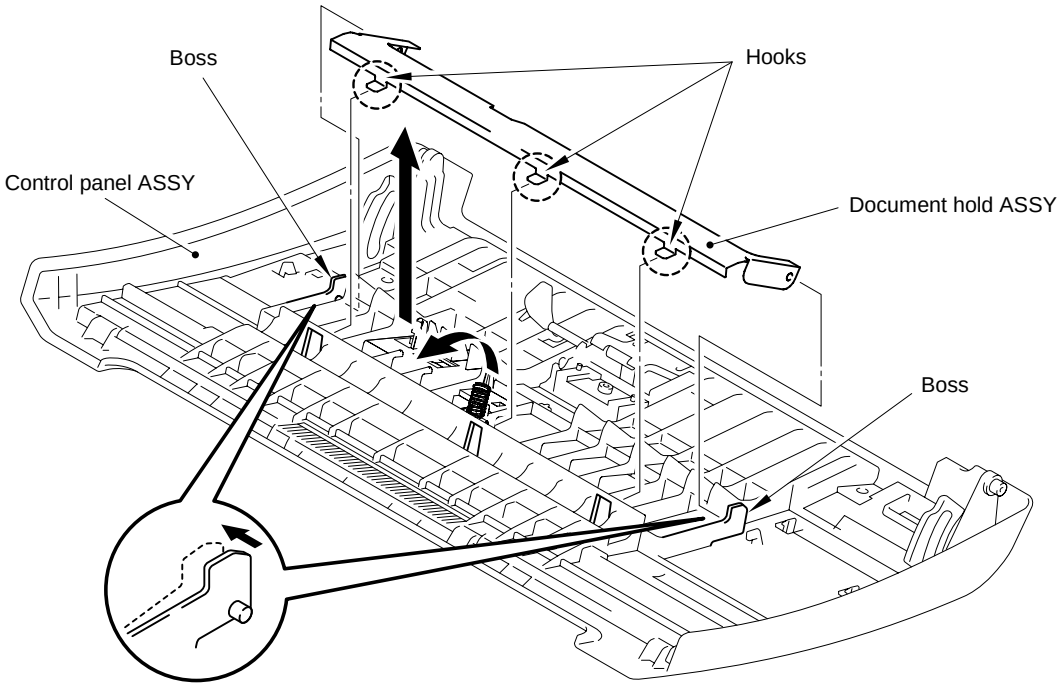


Fig. 4-29

(7) Remove the three cup B M3x8 Taptite screws.

(8) Release the three hooks, and then remove the paper feed chute.

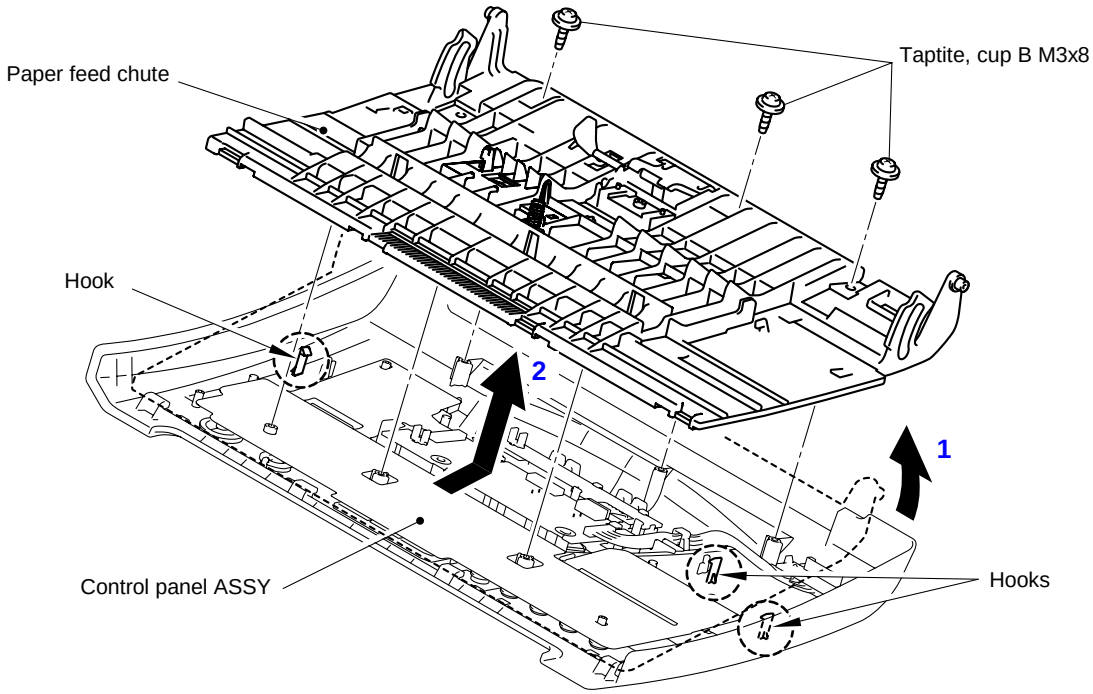


Fig. 4-30

(9) Remove the actuator F.

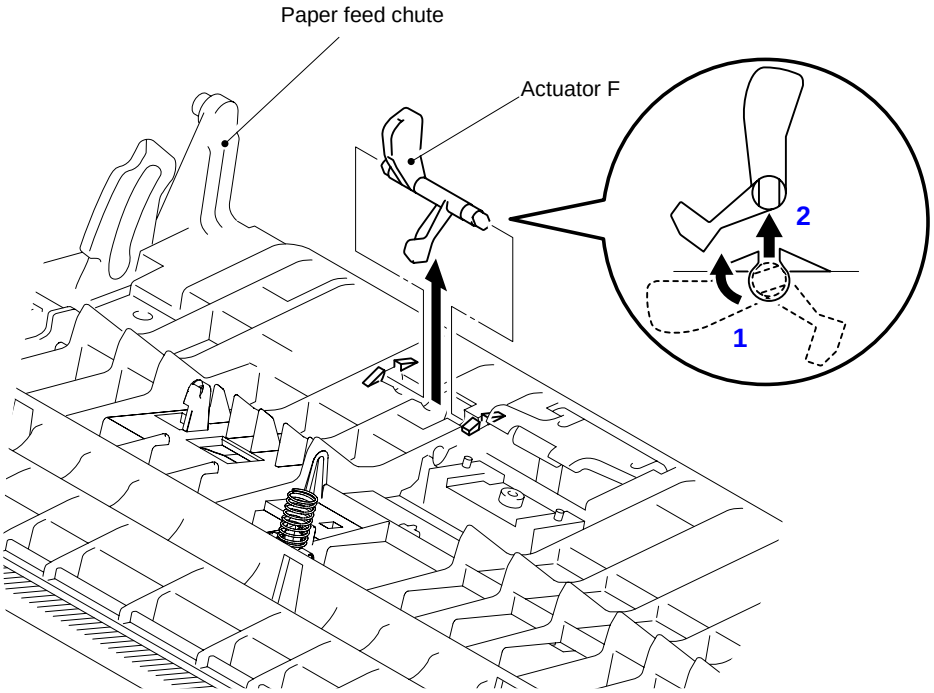


Fig. 4-31

(10) Release the lock of the connector, remove the cable from the panel PCB ASSY, and then remove the FPC key.

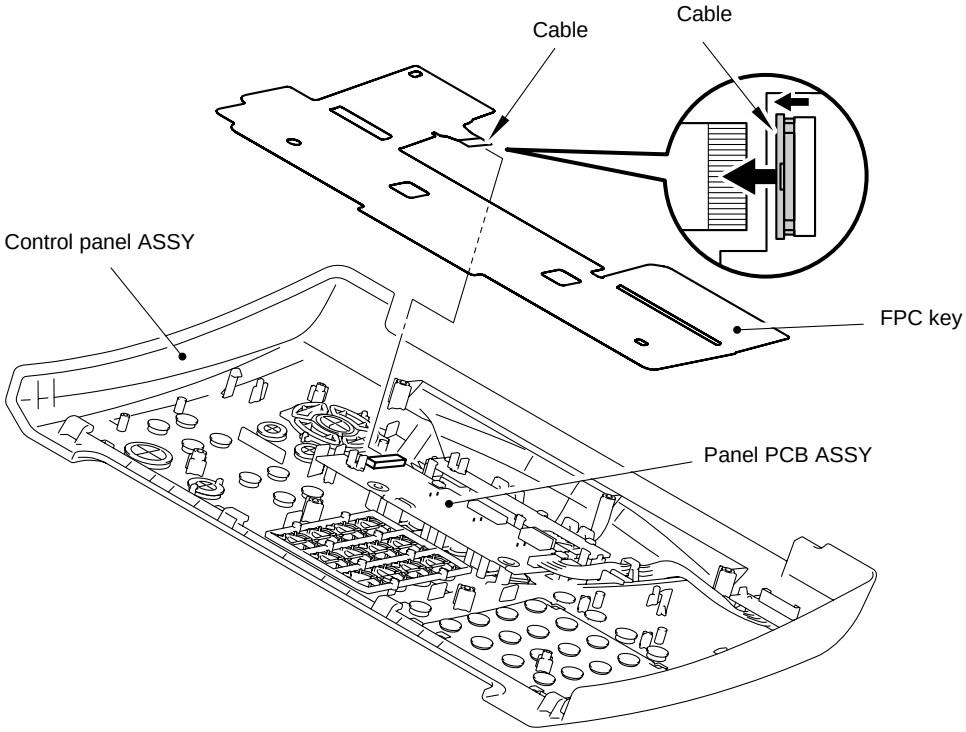


Fig. 4-32

(11) Release the lock, and then disconnect the cable of the LCD and the connector of the back light PCB ASSY.

(12) Remove the two cup B M3x8 Taptite screws and release the two hooks, and then remove the panel PCB ASSY.

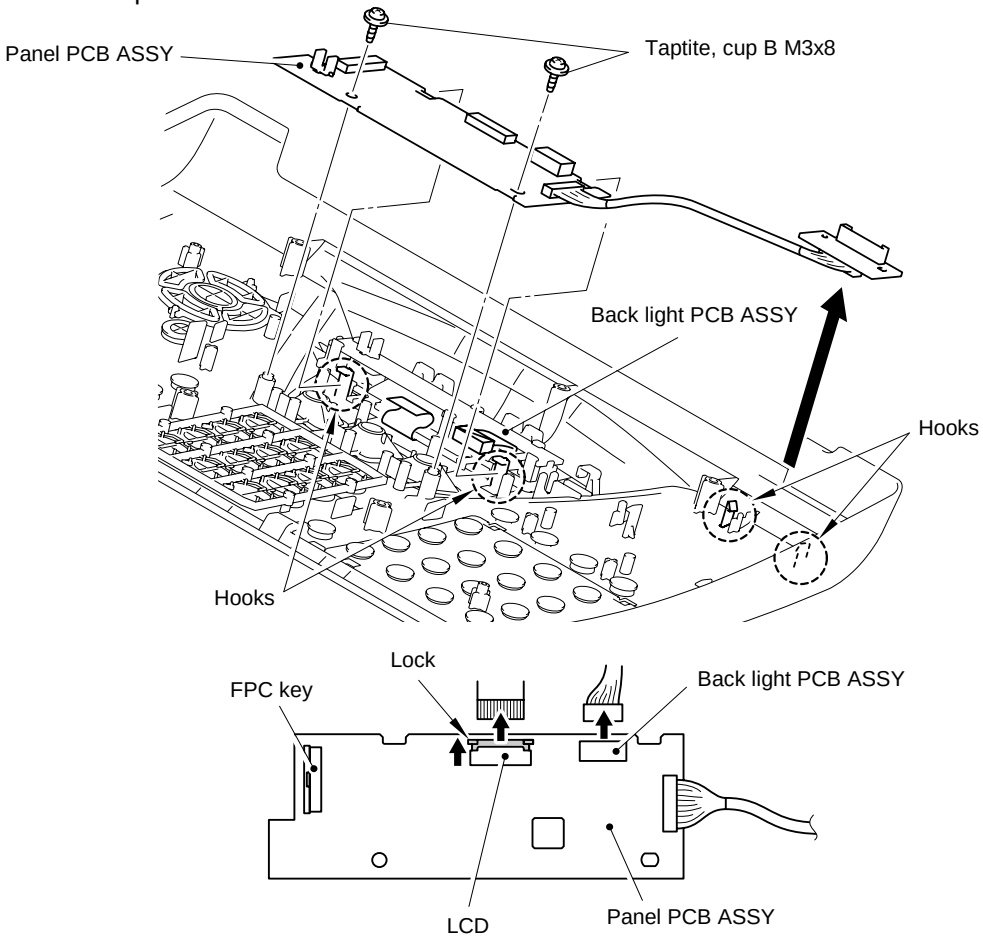


Fig. 4-33

(13) Release the two hooks, and then remove the LCD holder.

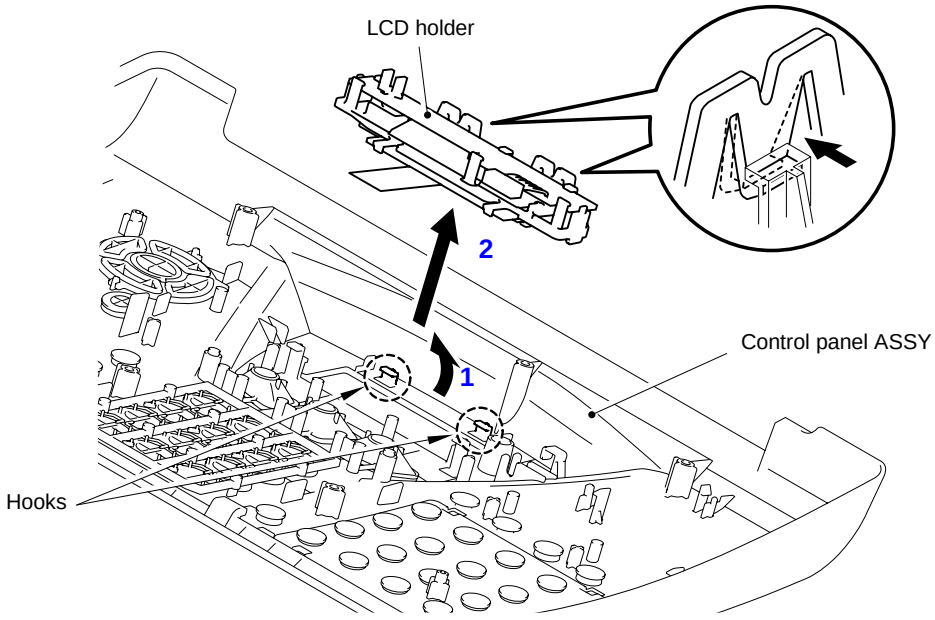


Fig. 4-34

(14) Release the two hooks, and then remove the LCD.

(15) Release the three hooks, and then remove the back light PCB ASSY.

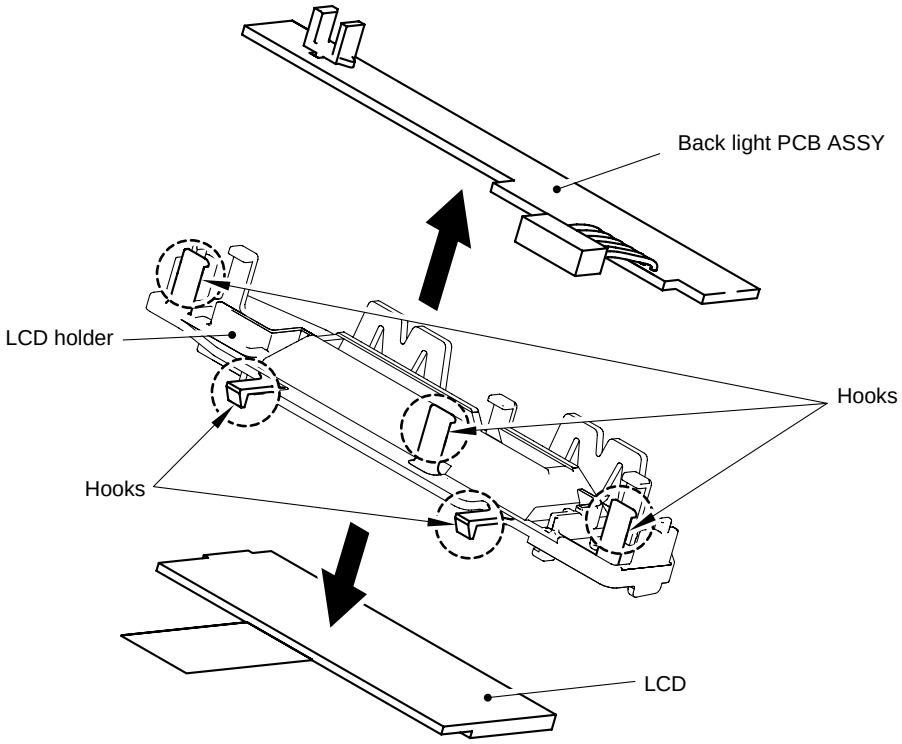


Fig. 4-35

3.7 Document Scanner

(1) Remove the four screws, and then remove the document chute ASSY.

(2) Disconnect the two connectors (scanning motor, CIS unit).

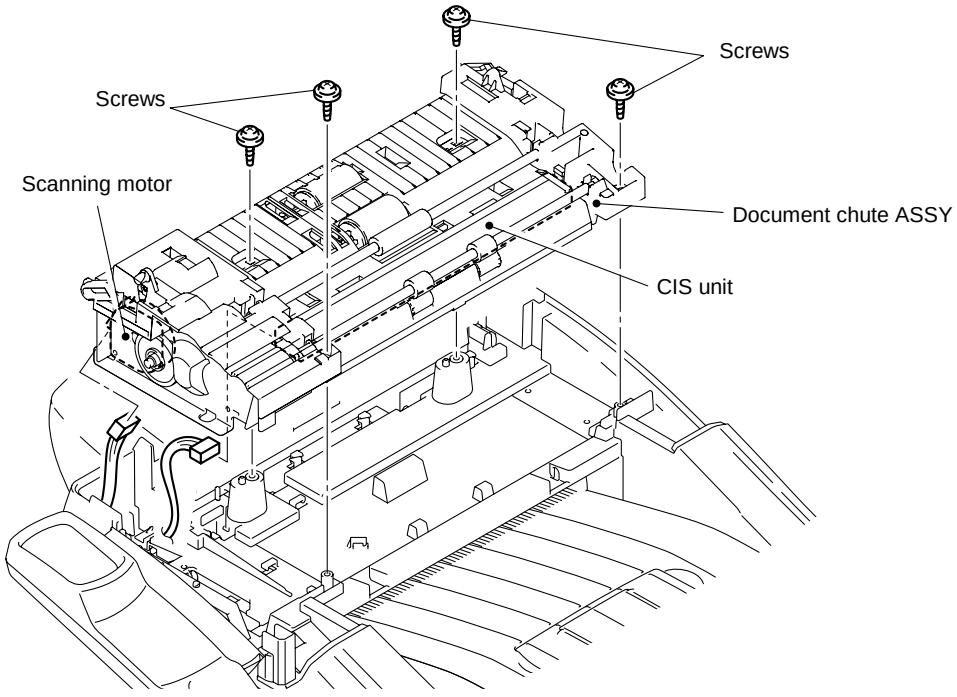


Fig. 4-36

(3) As moving the hook upward, remove the CIS unit.

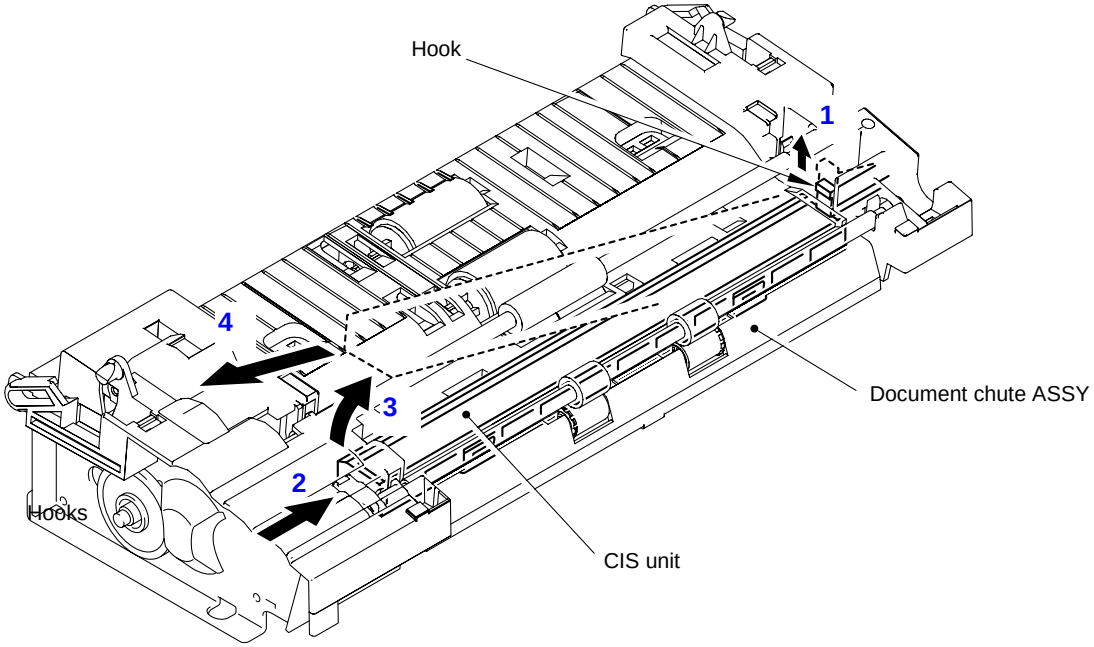


Fig. 4-37

(4) Release the hook of the gear cover, and then remove the gear cover.

(5) Remove the two screws, and then remove the LF ground plate spring.

(6) Release the hook, and then remove the ejection roller.

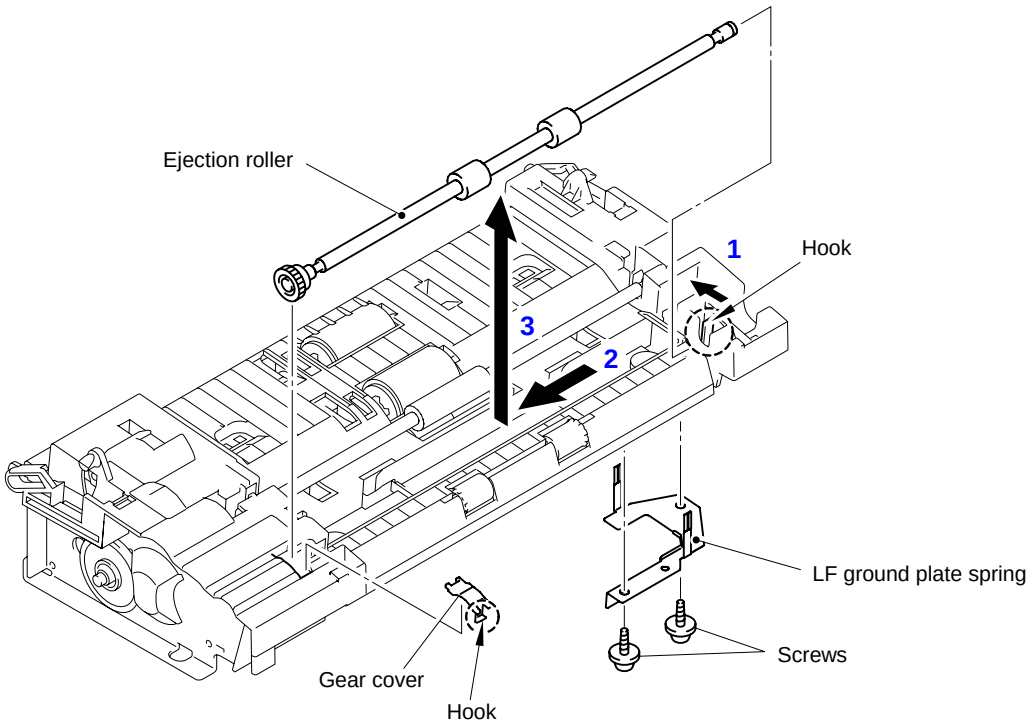


Fig. 4-38

(7) Release the hook, and then remove the LF roller.

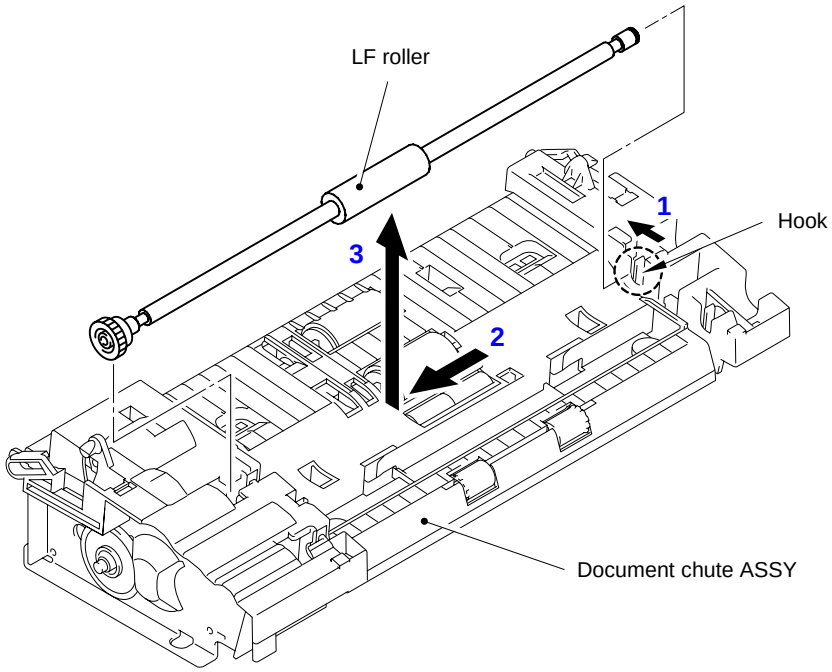


Fig. 4-39

(8) Remove the ejection pinch roller.

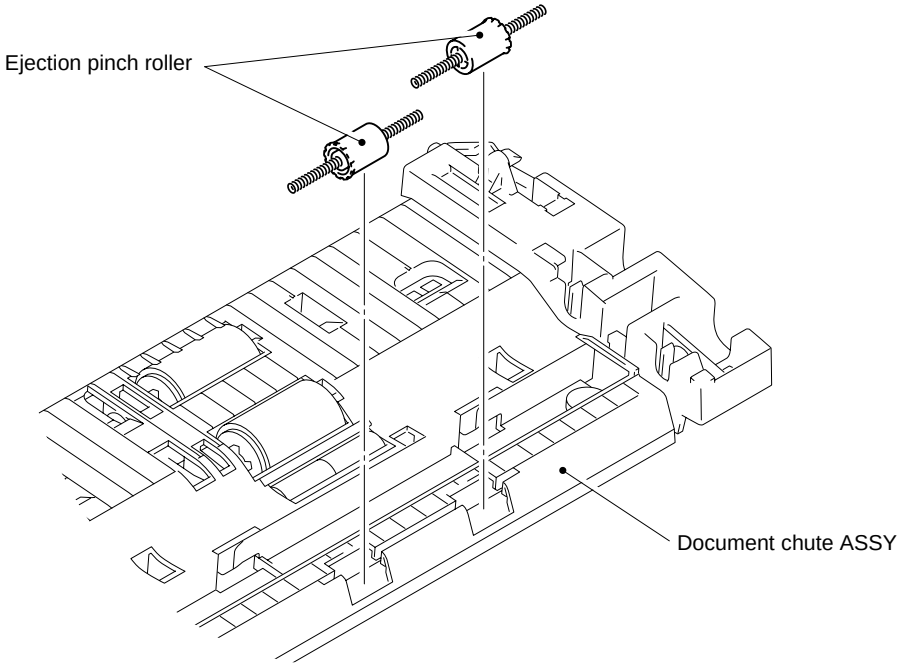


Fig. 4-40

(9) Remove the ejection roller B4 from the ejection pinch roller.

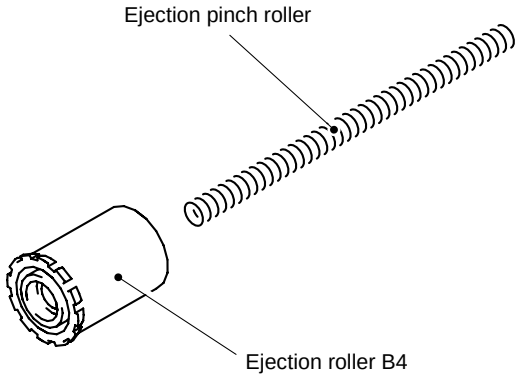


Fig. 4-41

(10) Remove the pan (S/P washer) M3x6 screw.

(11) Release the hook by rotating the scanning motor, and then remove the scanning motor.

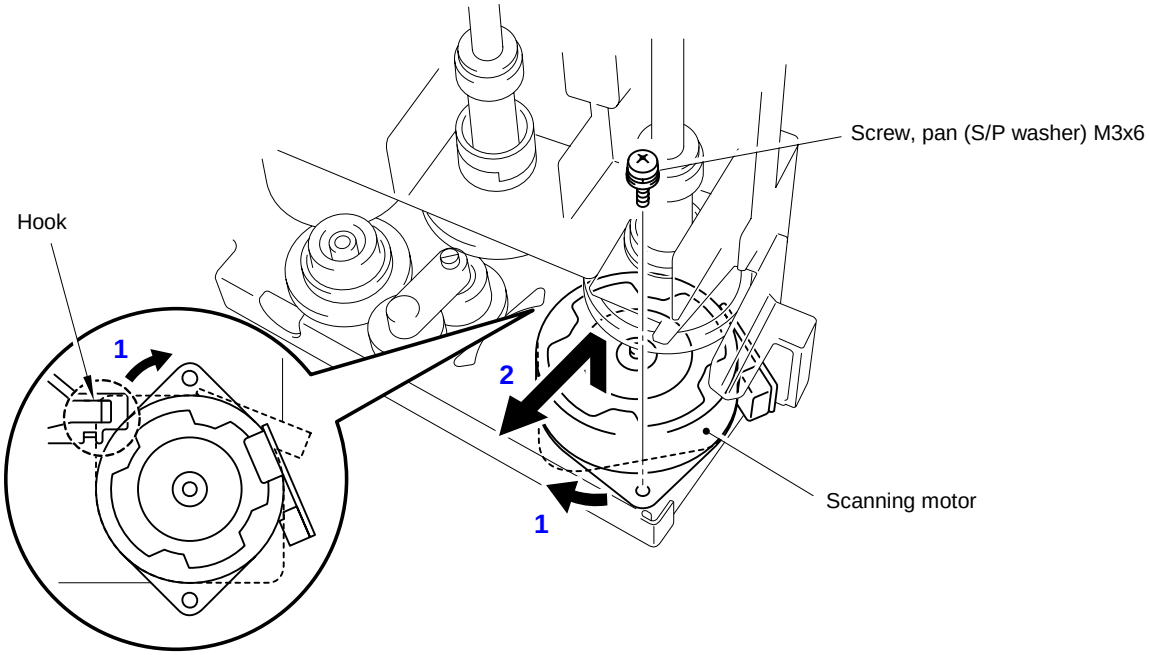


Fig. 4-42

(12) Release the hook, and then remove the two document separation roller.

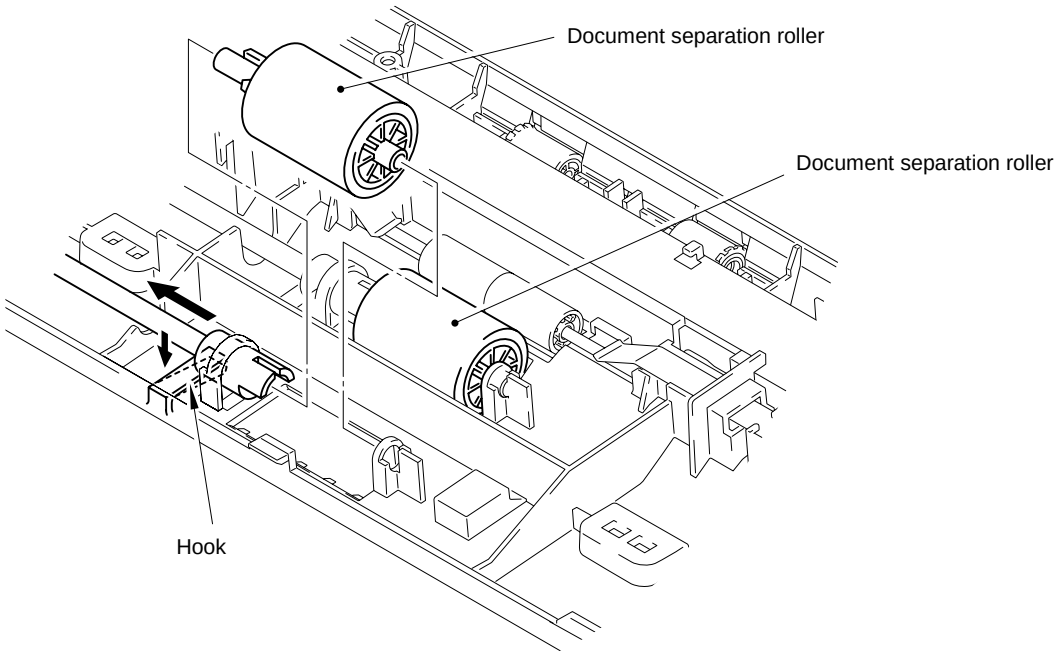


Fig. 4-43

(13) Remove the LF ground spring.

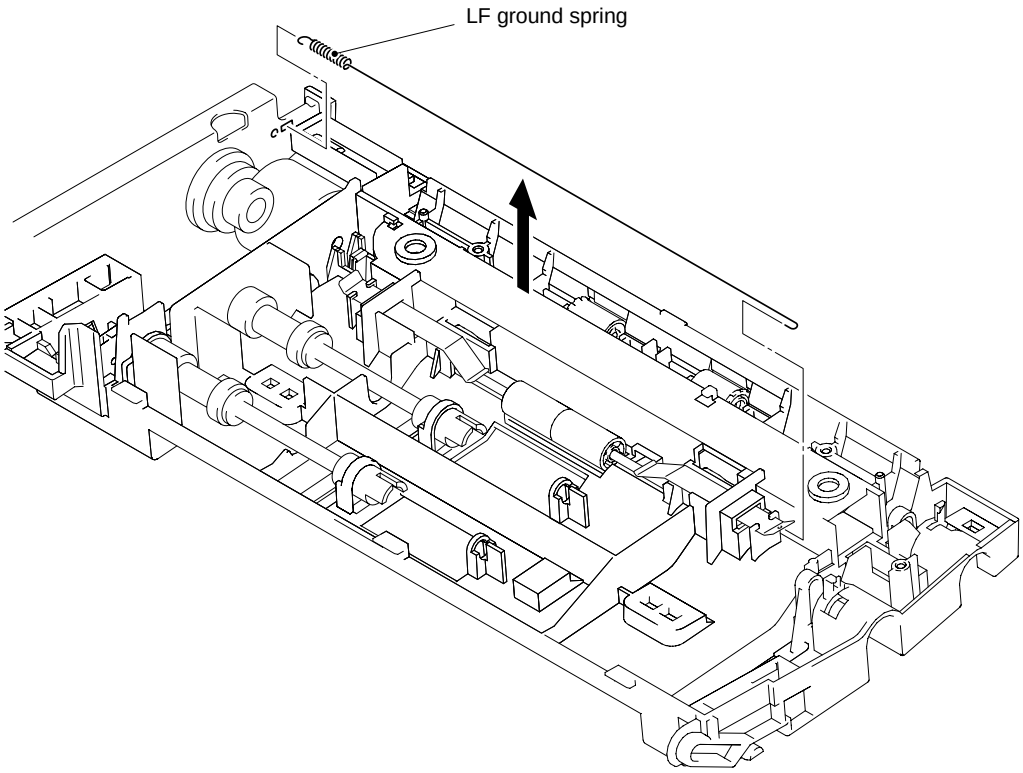


Fig. 4-44

3.8 Outer Chute

(1) Remove the outer chute.

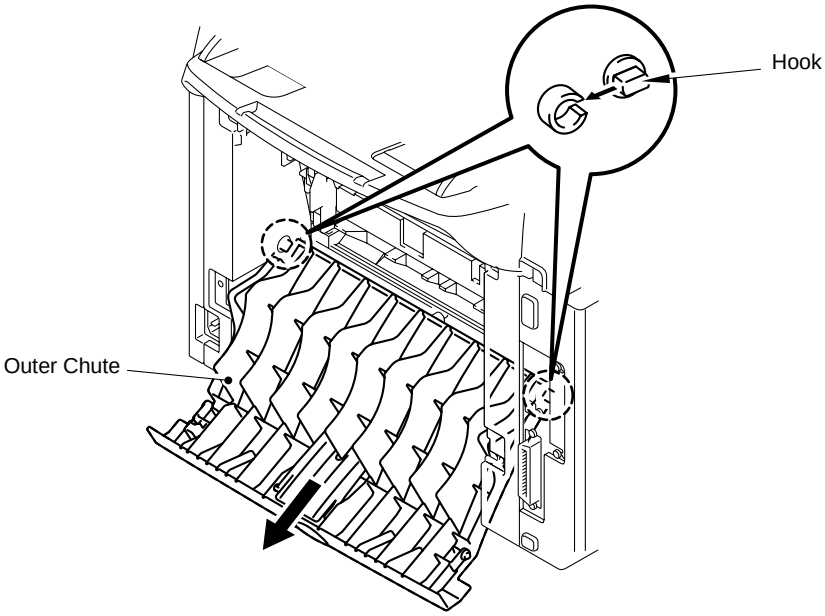


Fig. 4-45

(2) Remove the outer chute tray.

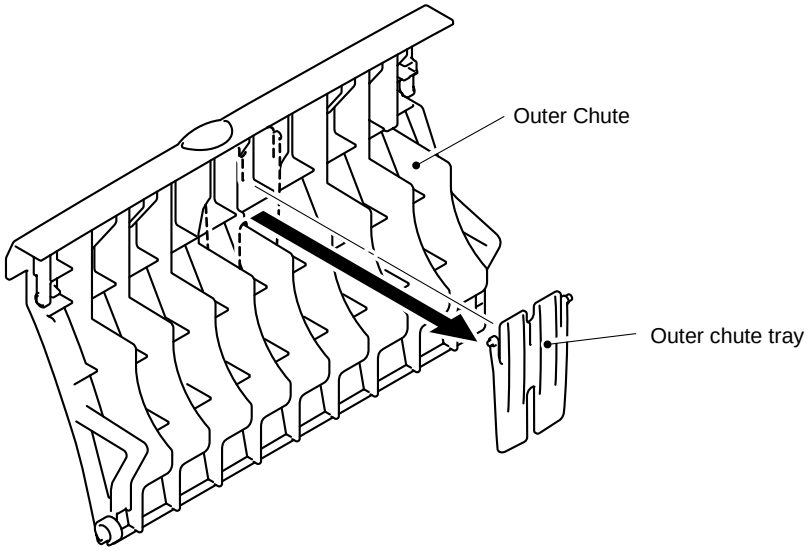


Fig. 4-46

3.9 Rear Cover L/R

(1) Remove the two bind B M4x12 Taptite screws, and then remove the rear cover L.

(2) Remove the two bind B M4x12 Taptite screws, and then remove the rear cover R.

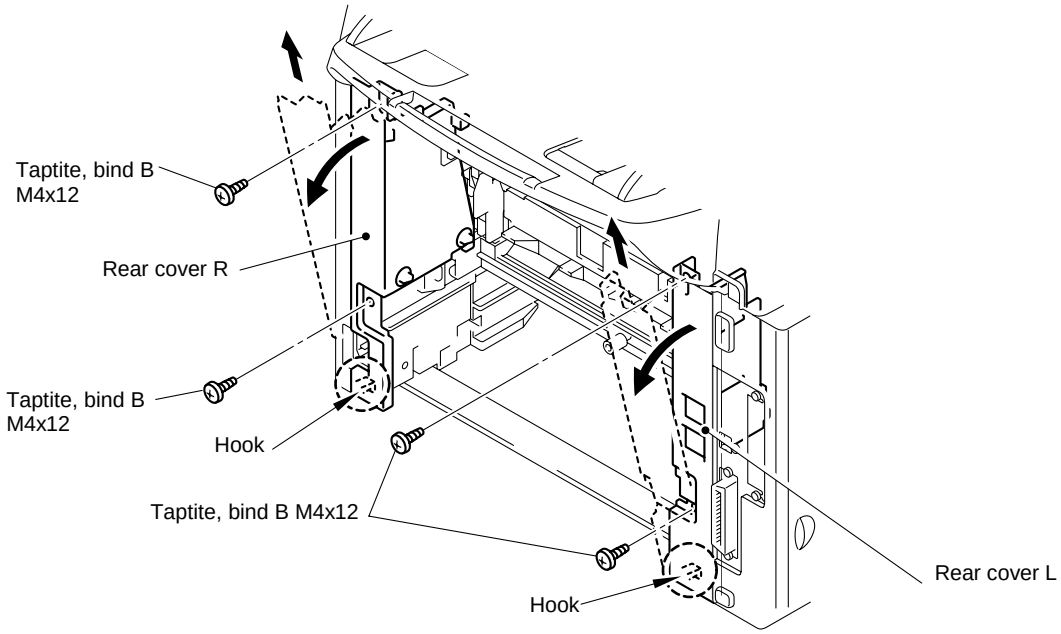


Fig. 4-47

3.10 Side Cover L/R

(1) Remove the three bind B M4x12 Taptite screws, and then remove the side cover R.

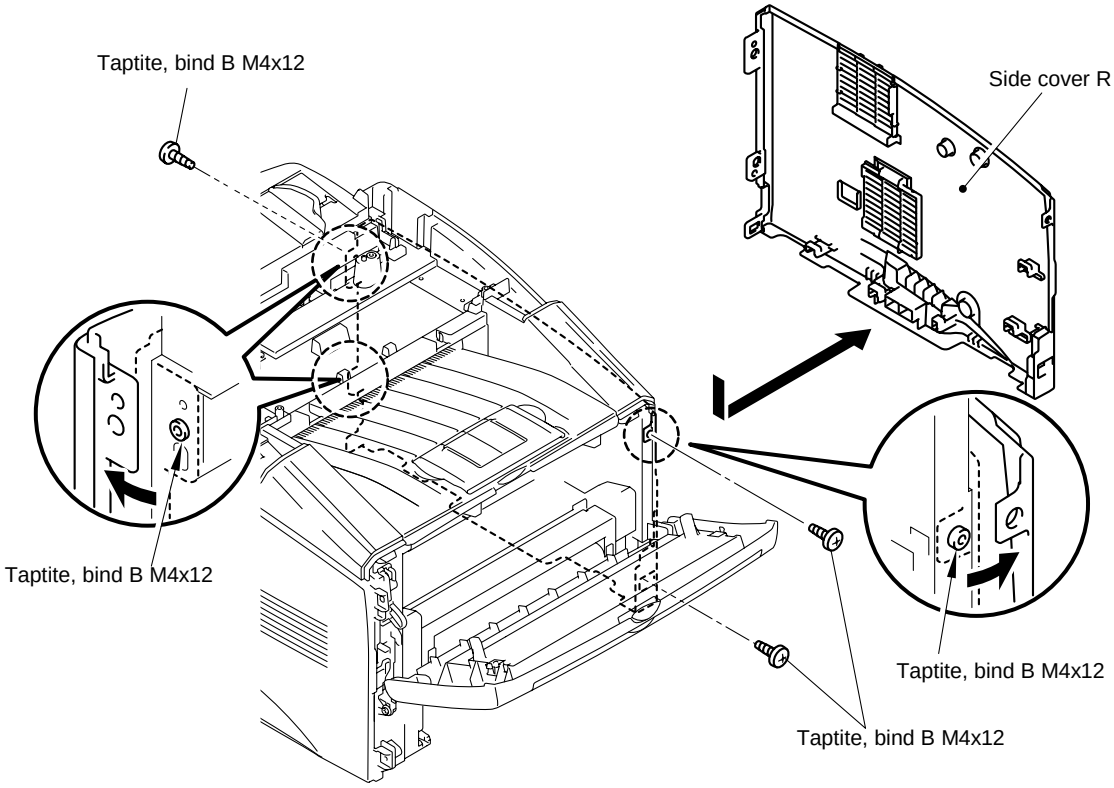


Fig. 4-48

(2) Remove the four bind B M4x12 Taptite screws, and then remove the side cover L.

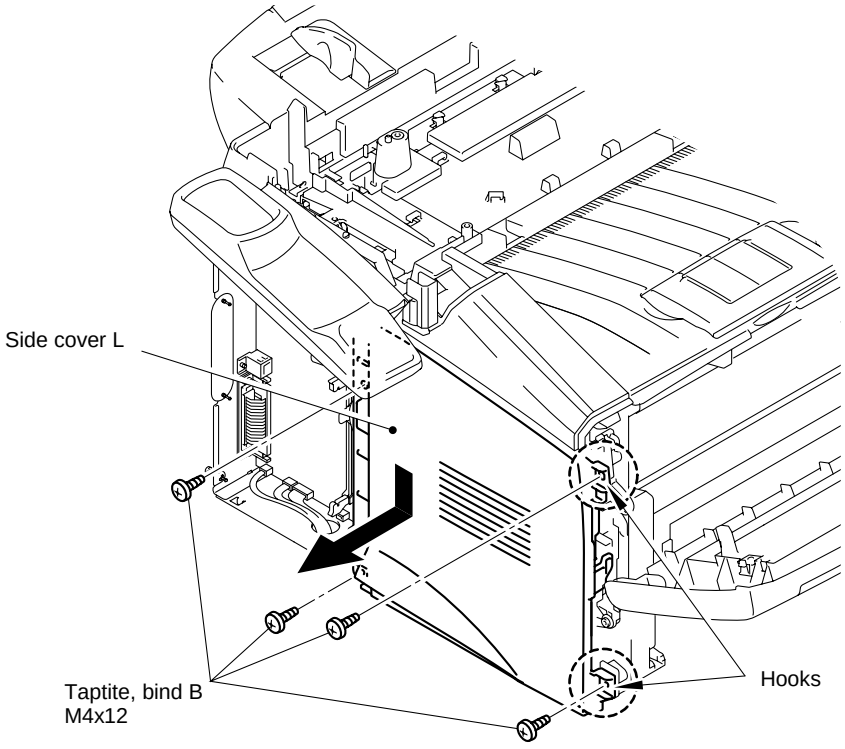


Fig. 4-49

3.11 Top Cover ASSY

(1) Disconnect the four connectors.

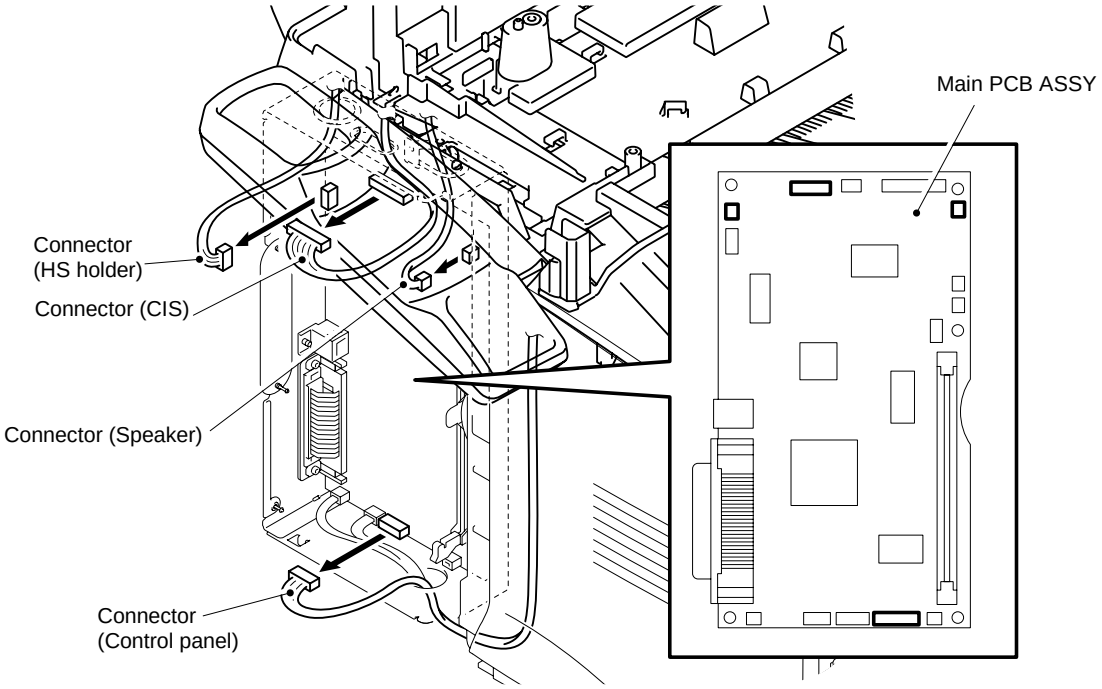


Fig. 4-50

(2) Release the hook, and then remove the speaker hold spring and the speaker.

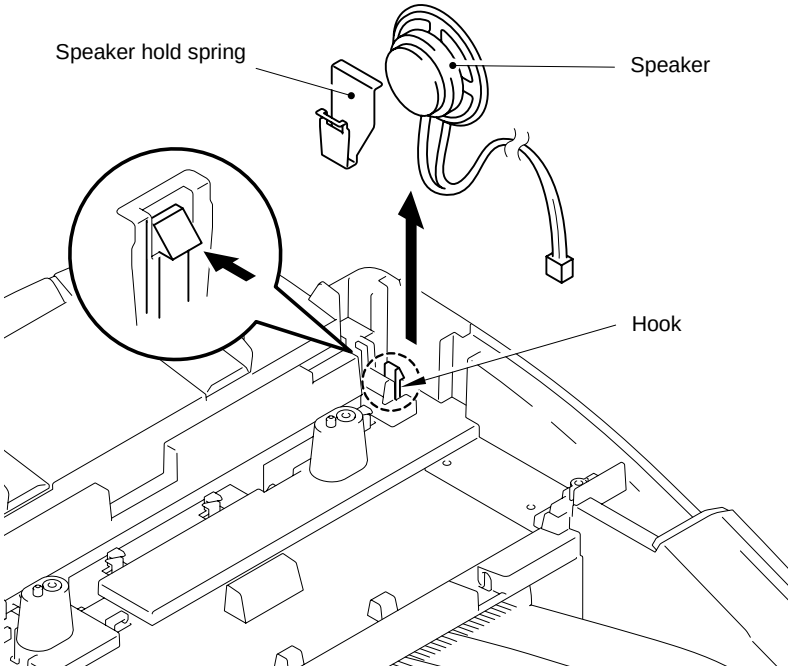


Fig. 4-51

(3) Remove the two screws, release the four hooks, and then remove the top cover ASSY.

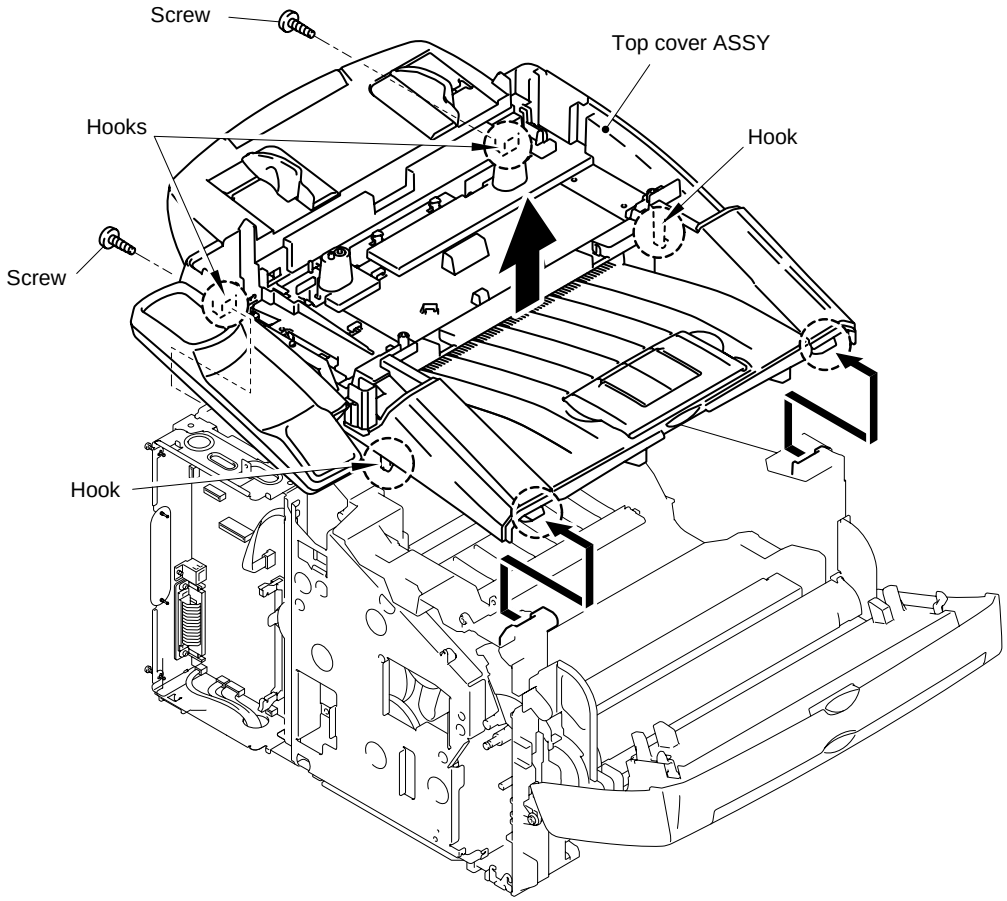


Fig. 4-52

(4) Remove the two cup B M3x10 Taptite screws and two pins, and then remove the handset holder ASSY.

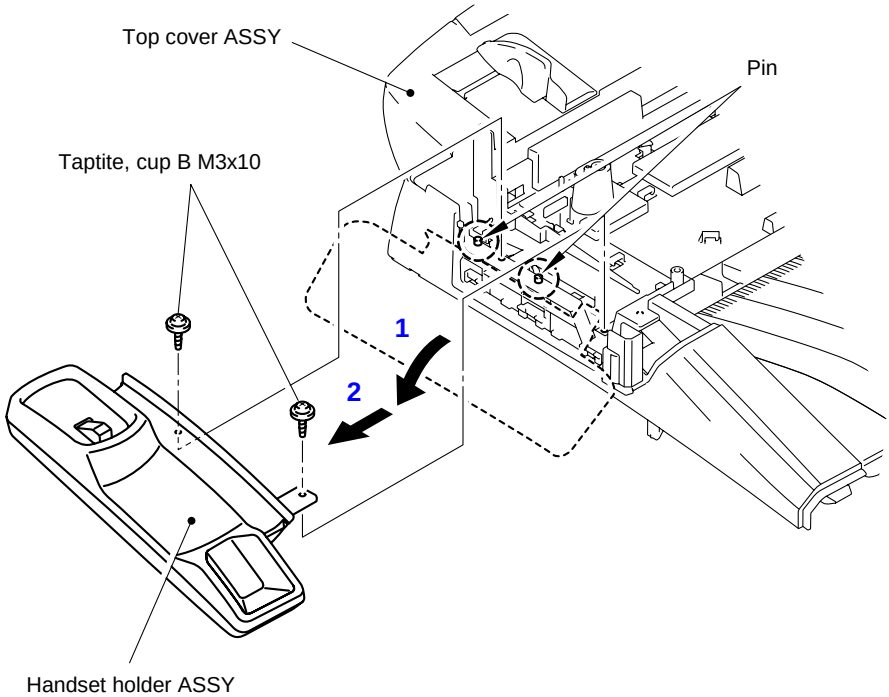


Fig. 4-53

(5) Release the four hooks, and then remove the handset holder upper.

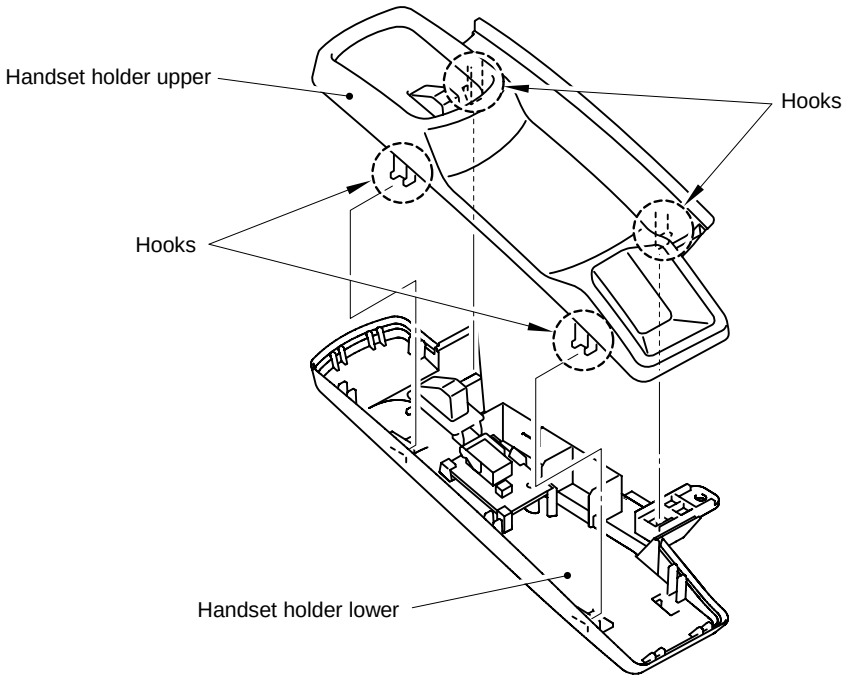


Fig. 4-54

(6) Release the hook, and then remove the hook PCB ASSY.

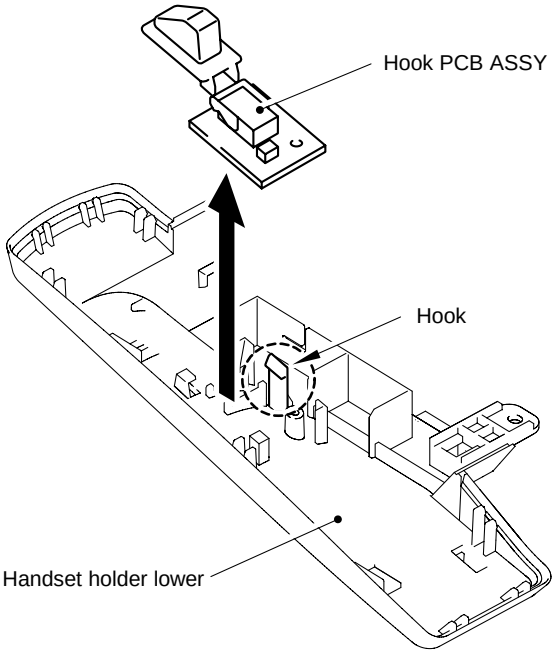


Fig. 4-55

(7) Remove the four bind B M4x12 Taptite screws.

(8) Release the two hooks, and then remove the inner chute.

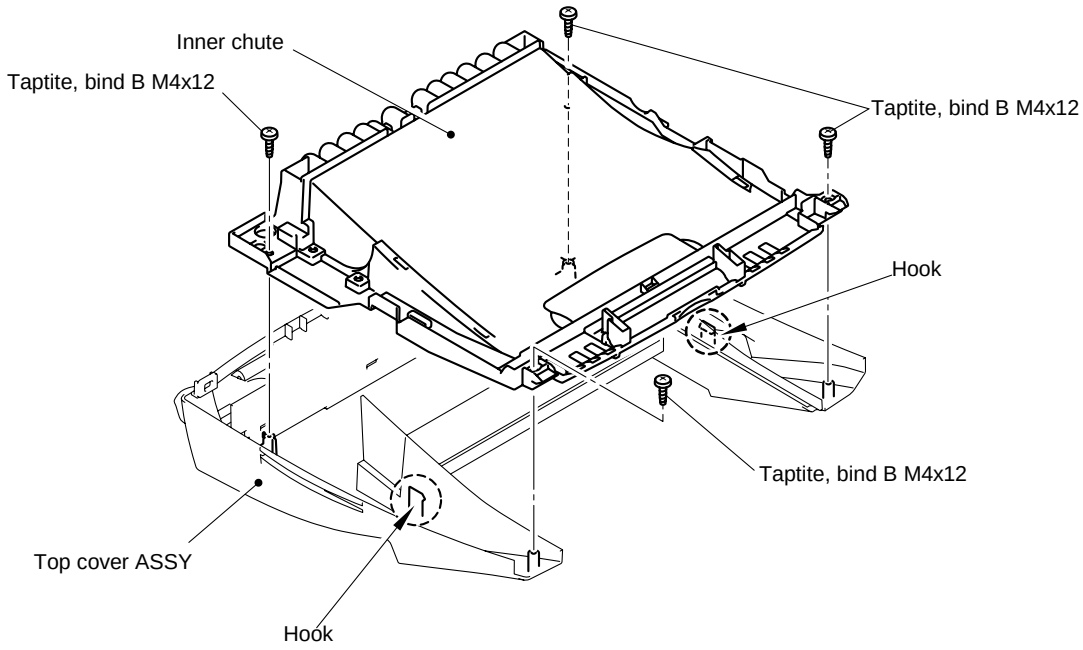


Fig. 4-56

(9) Remove the corrugation pinch roller L, R and pinch roller holder.

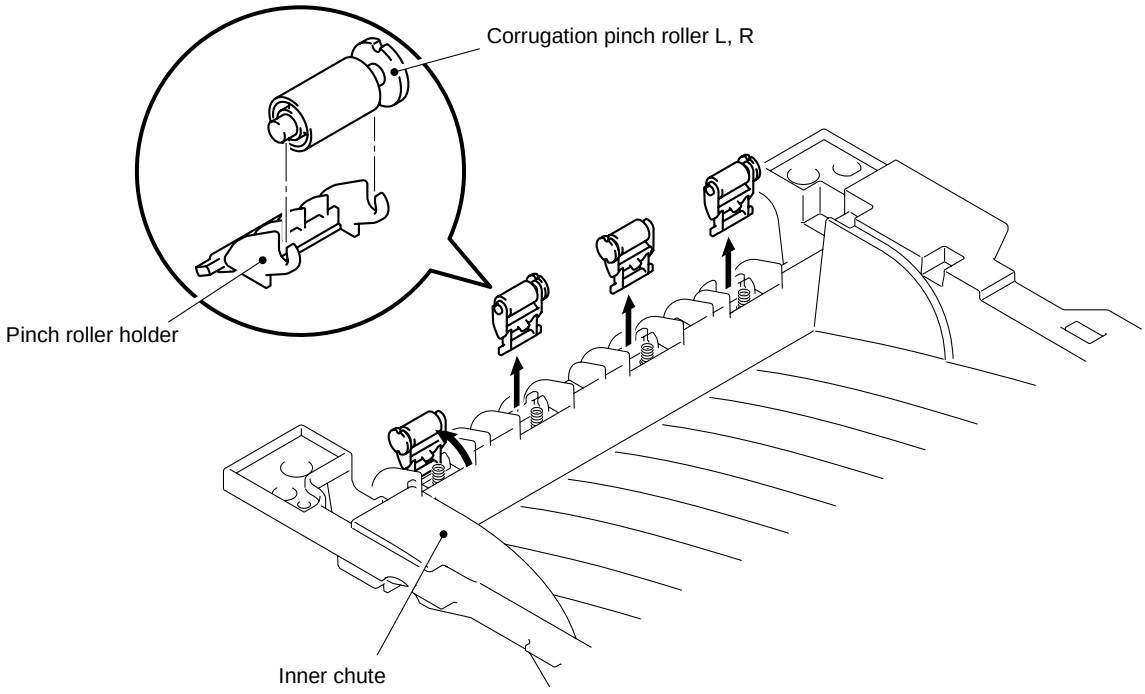


Fig. 4-57

(10) Remove the paper stopper and the paper stopper S.

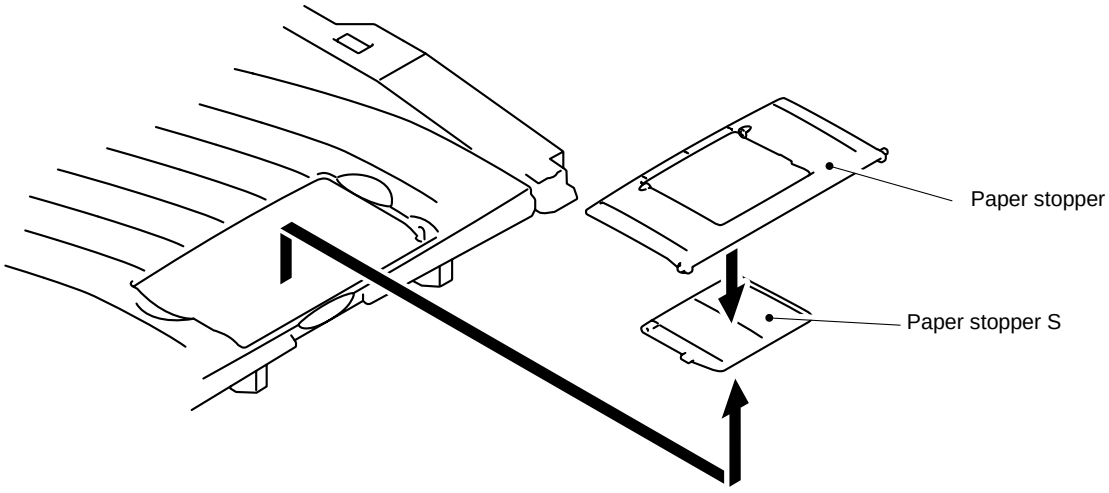


Fig. 4-58

3.12 Front Cover ASSY

(1) Release the link.

(2) Remove the front cover ASSY.

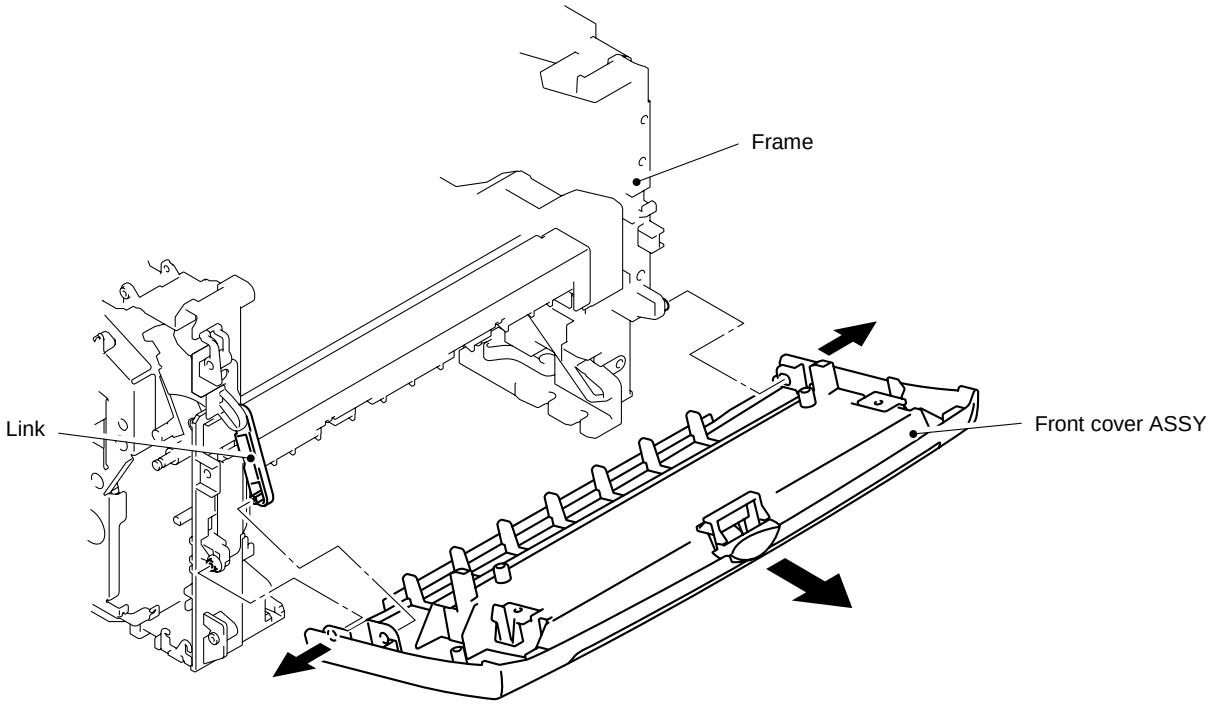


Fig. 4-59

3.13 NCU

(1) Disconnect the connector.

(2) Remove the two cup S M3x6 Taptite screws, and then remove the NCU unit.

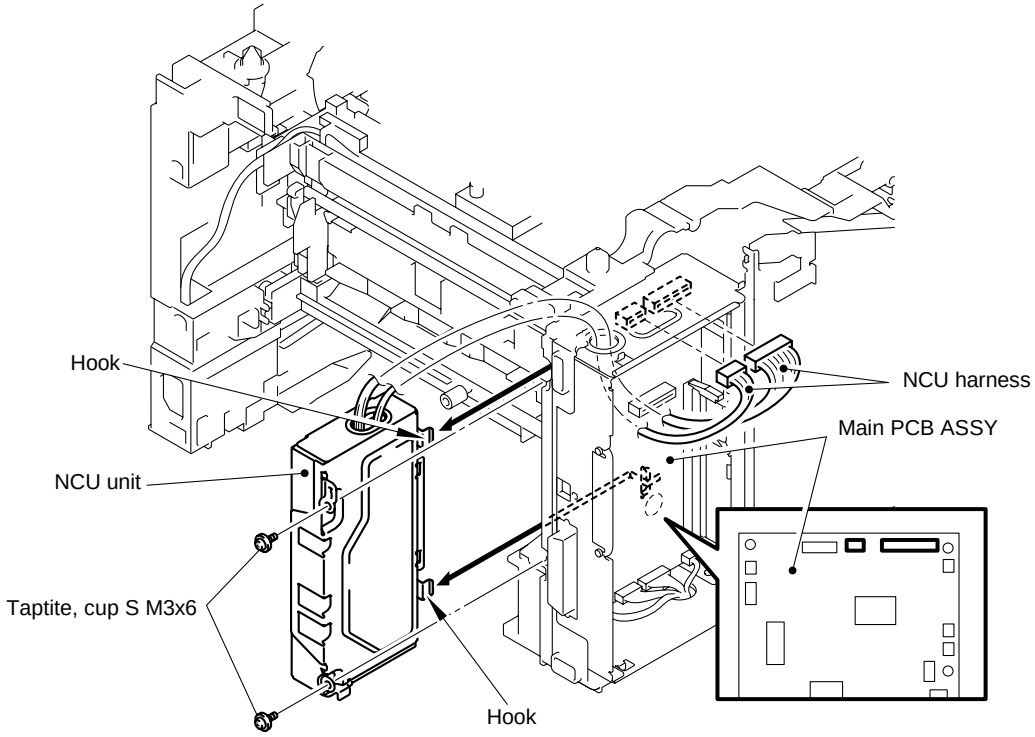


Fig. 4-60

(3) Remove the cup S M3x6 Taptite screw, and then remove the NCU shield cover.

(4) Disconnect the two connectors of the NCU harness.

(5) Remove the two cup S M3x6 Taptite screws, and then remove the NCU PCB ASSY.

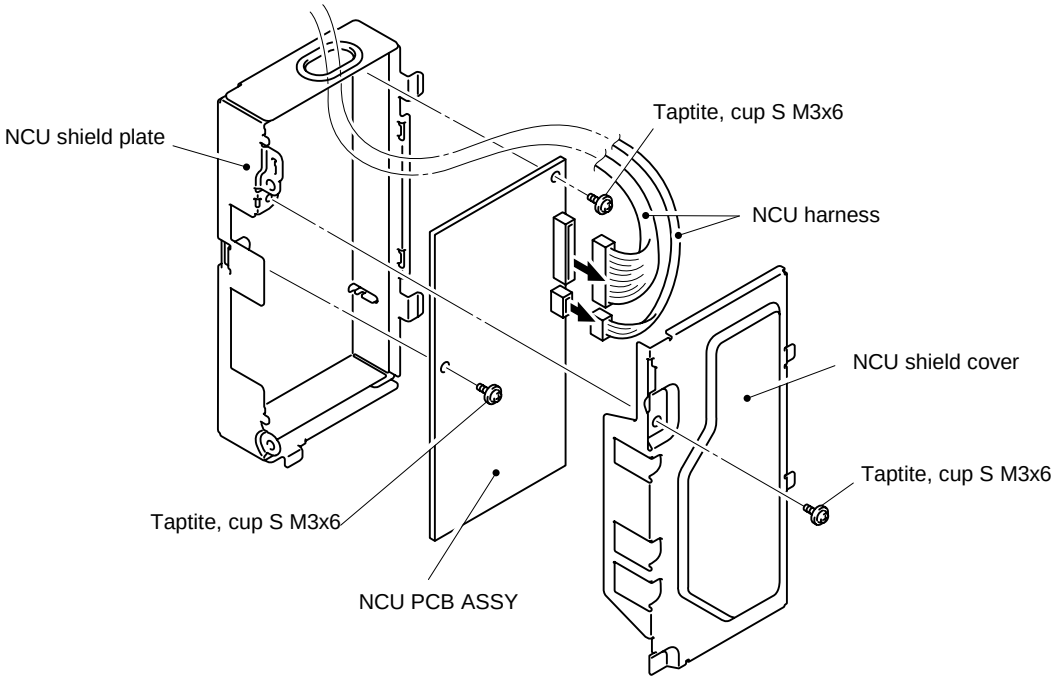


Fig. 4-61

3.14 Fixing Unit

(1) Disconnect the heater harness and thermistor harness.

(2) Remove the bind B M4x12 Taptite screw and the shoulder screw, and then remove the fixing unit.

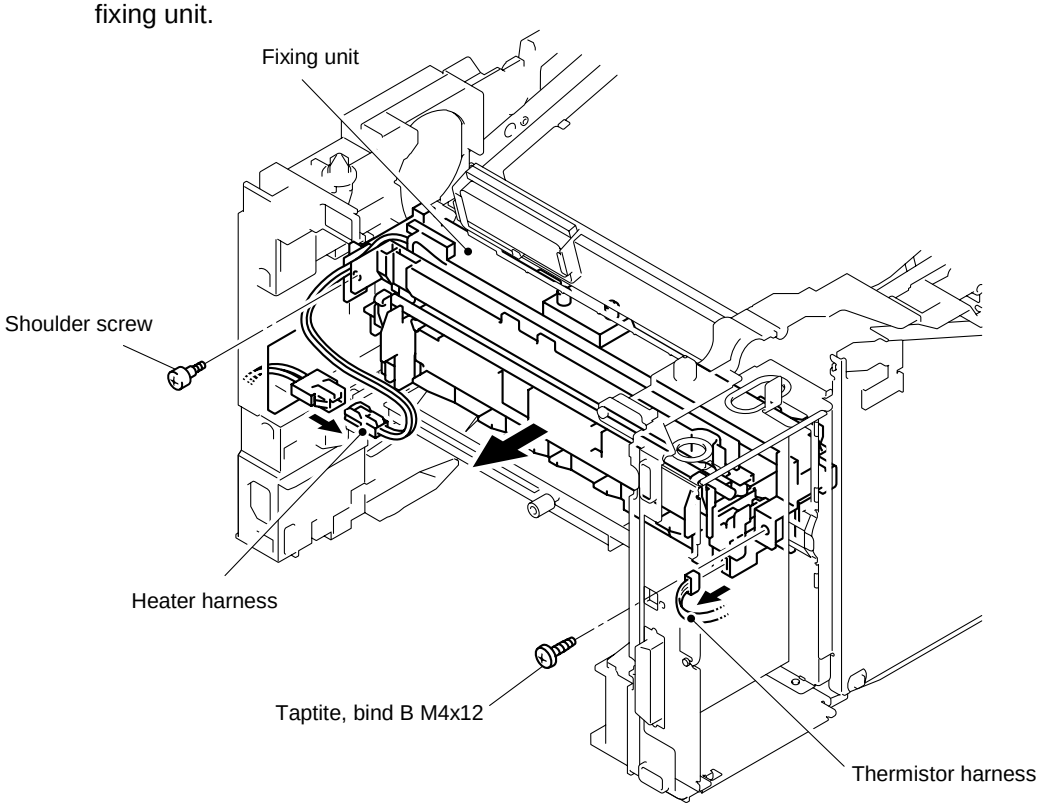


Fig. 4-62

(3) Remove the three cup B M3x10 Taptite screws, and then remove the FU front paper guide from the fixing unit.

Hint:
Regarding the proper mounting orientation of the FU front paper guide, please refer to Fig. 4-62. Be sure not to mount it upside down.

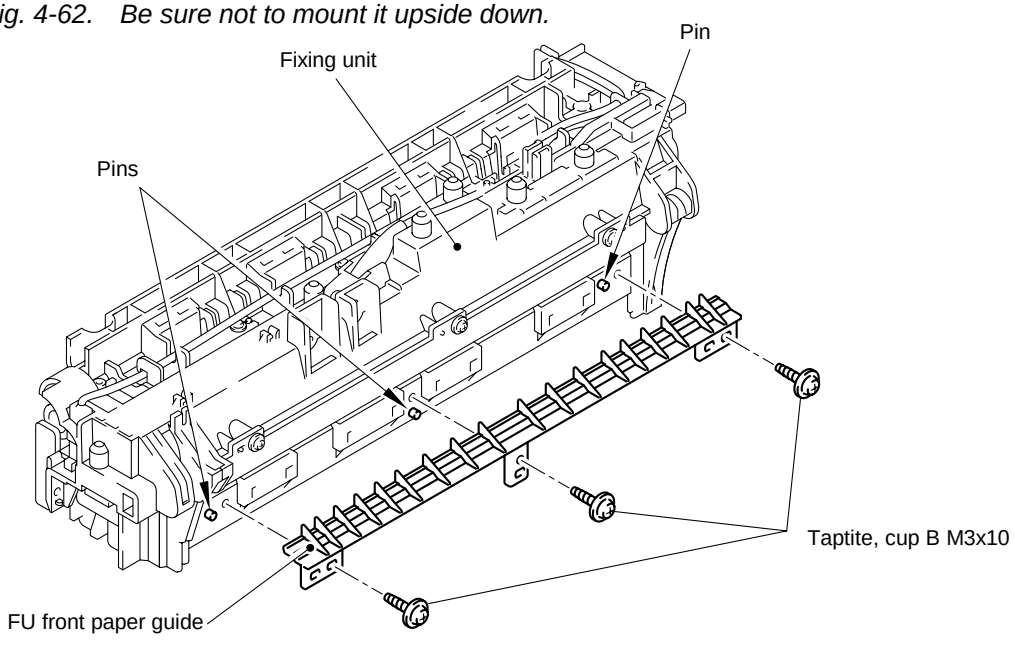


Fig. 4-63

(4) Remove the three cup B M3x10 Taptite screws, and then remove the star wheel holder.

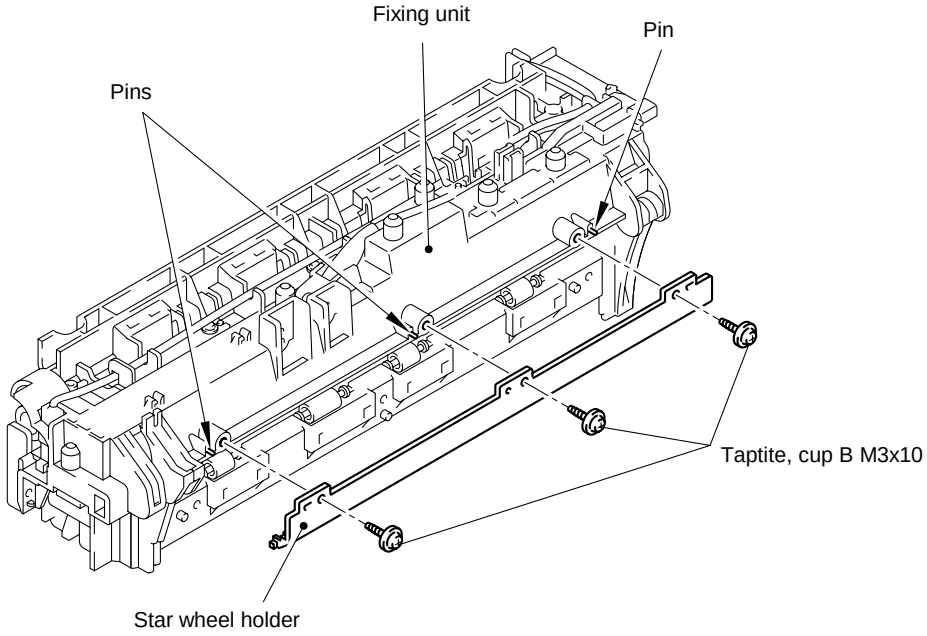


Fig. 4-64

(5) Remove the cup B M3x12 Taptite screw.

(6) Release the thermistor ASSY harness from the four hooks.

(7) Remove the thermistor ASSY.

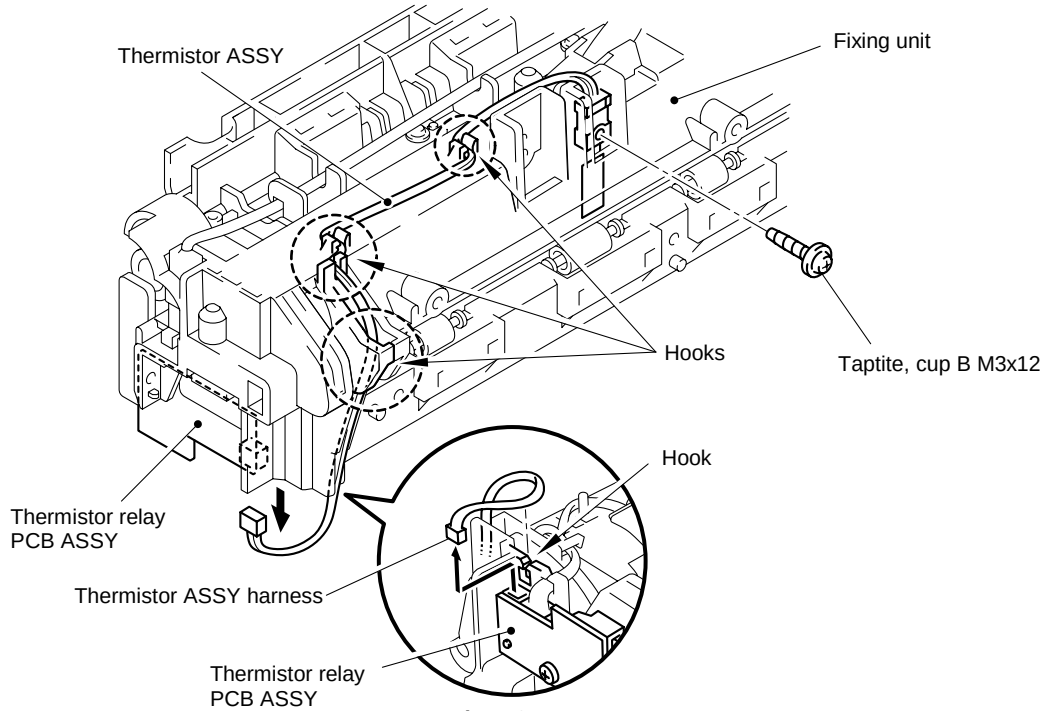


Fig. 4-65

NOTE:

When re-assembling the thermistor to the FU frame upper, ensure the direction of the thermistor is correct referring to the figure below;

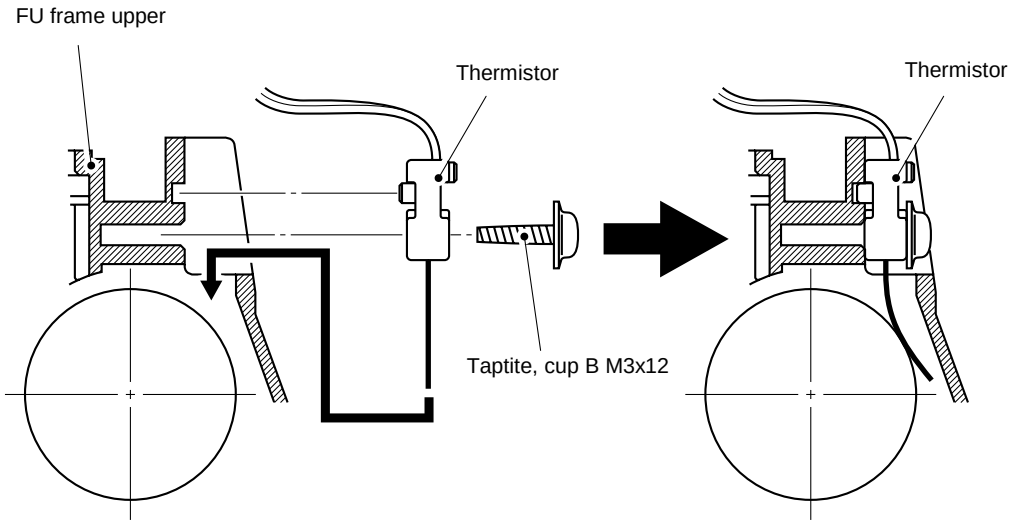


Fig. 4-66

(8) Remove the two cup B M3x20 Taptite screws from the FU frame upper.

(9) Release the hooks, and then remove the FU frame upper from the FU frame lower.

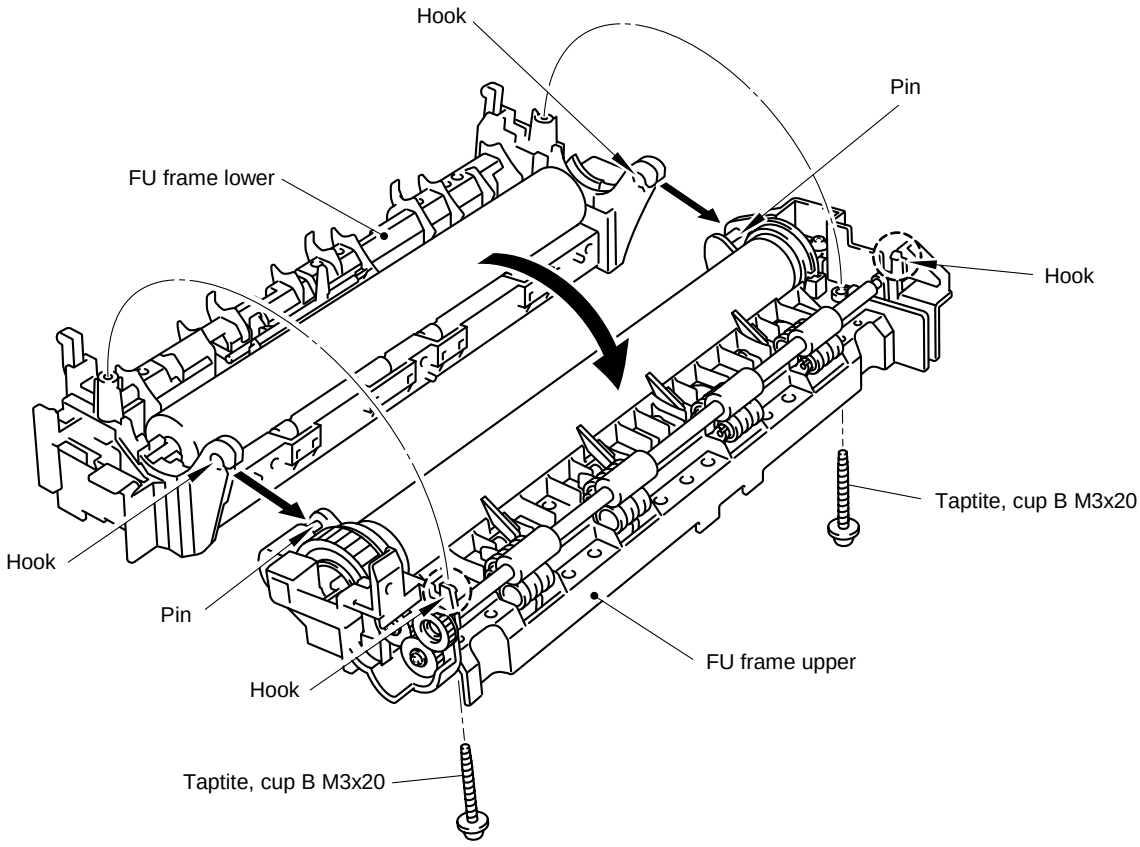


Fig. 4-67

(10) Remove the two pan (S/P washer) M26x8 Taptite screws.

(11) Remove the heat roller 25.

(12) Remove the halogen lamp.

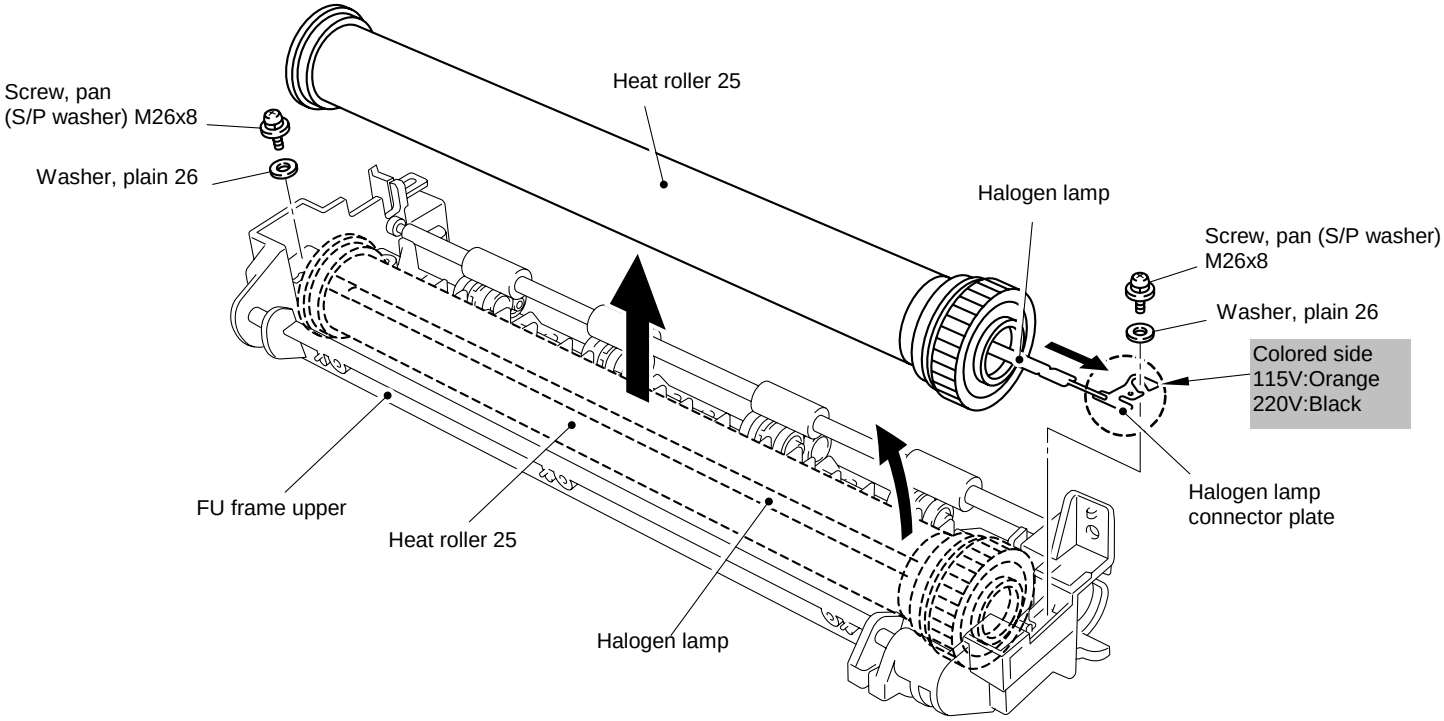


Fig. 4-68

NOTE:

When re-assembling the halogen lamp, ensure that the direction of the halogen lamp is correct referring to the figure above.

> ***CAUTION:***
>
> - *Never touch the surface of the halogen lamp.*
> - *When securing the screw to assemble the halogen lamp connector plate, ensure you use the Fu lamp assembly jig ASSY as shown in the figure below to avoid damaging the edge of the halogen lamp.*

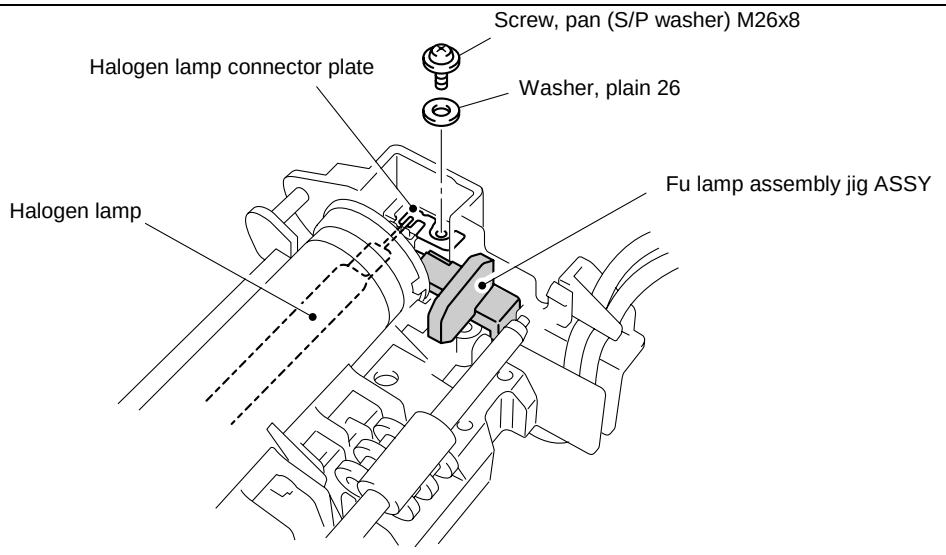


Fig. 4-69

(13) Remove the HR bearing 25.

(14) Remove the HR gear 34.

(15) Remove the HR retaining ring 25.

(16) Remove the heat roller washer 25.

(17) Remove the HR bearing 25.

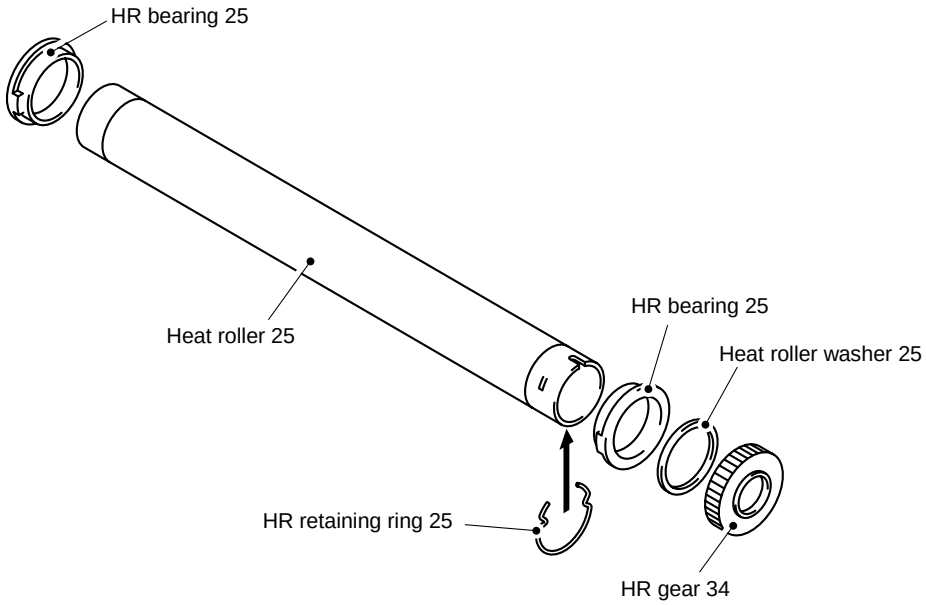


Fig. 4-70

> ***CAUTION:***
> *Never touch the surface of the heat roller.*

NOTE:

- *When re-assembling the heat roller 25 to the FU frame upper, place the two projections onto the bosses on the frame as shown in the figure below.*

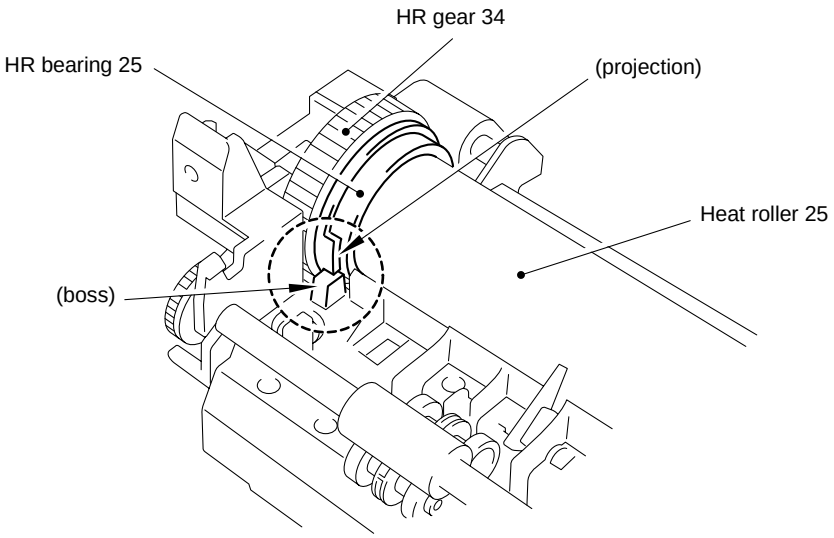


Fig. 4-71

- *When re-assembling the heat roller 25 to the FU frame upper, ensure you do not damage the heat roller 25 with the four separate claw ASSY on the FU frame upper.*

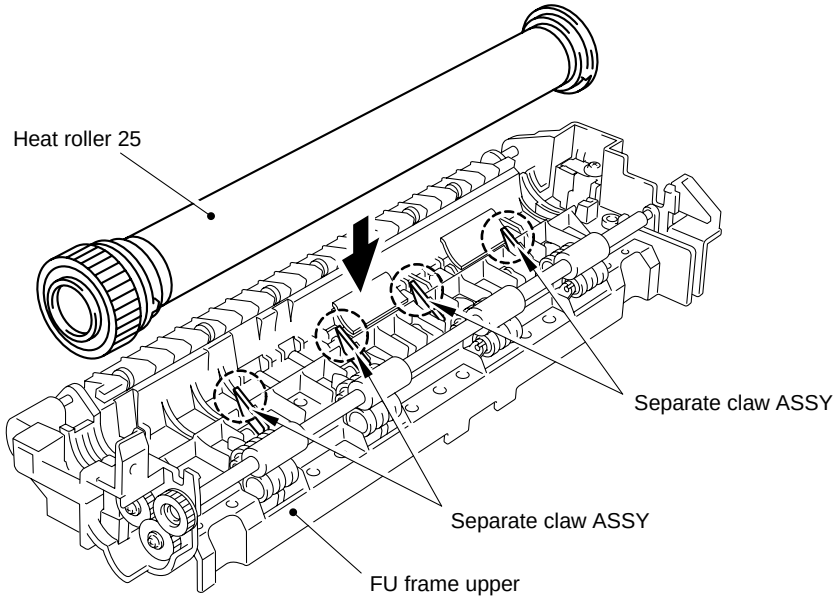


Fig. 4-72

(18) Remove the pressure roller 25.

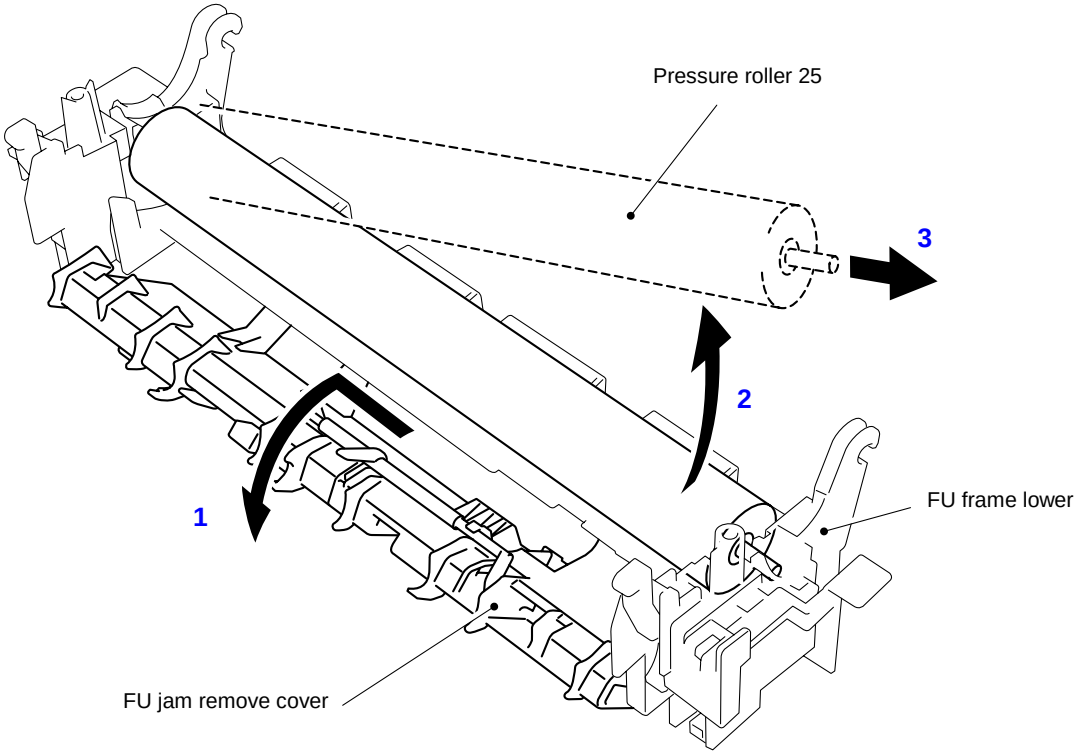


Fig. 4-73

(19) Remove the three cleaner spring S.

(20) Remove the three cleaner pinch roller ASSY S.

(21) Remove the cleaner spring L.

(22) Remove the cleaner pinch roller ASSY L.

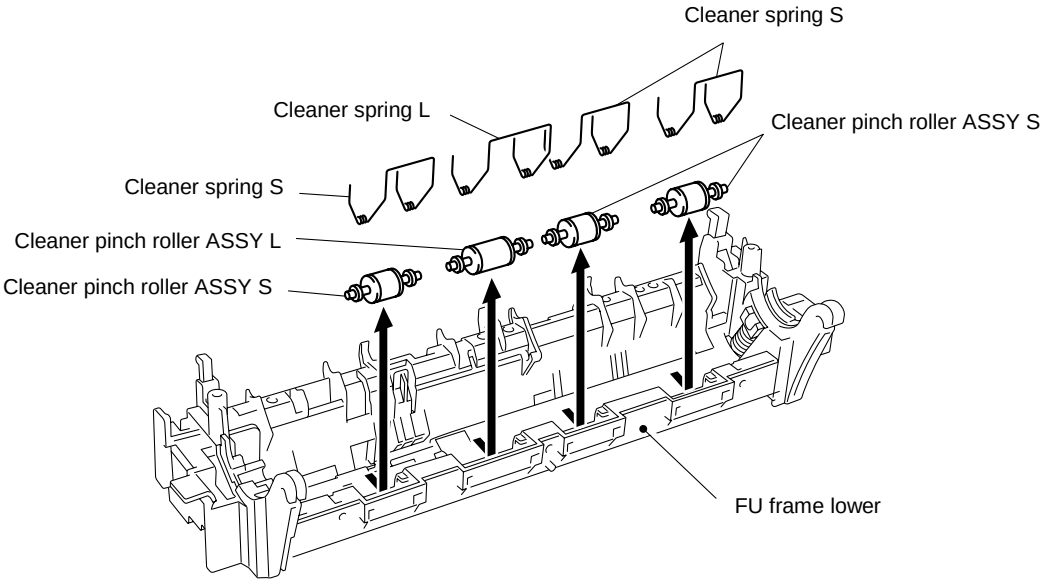


Fig. 4-74

NOTE:

- *When re-assembling the cleaner pinch roller ASSY complete with the cleaner spring onto the FU frame lower, ensure the direction of the roller is correct referring to the figure above.*
- *Ensure that the both springs are seated correctly in the locating channel and does not protrude from either end.*
- *Ensure also that the proper spring is fixed to the each cleaner pinch roller ASSY because the both springs are NOT identical with each other.*

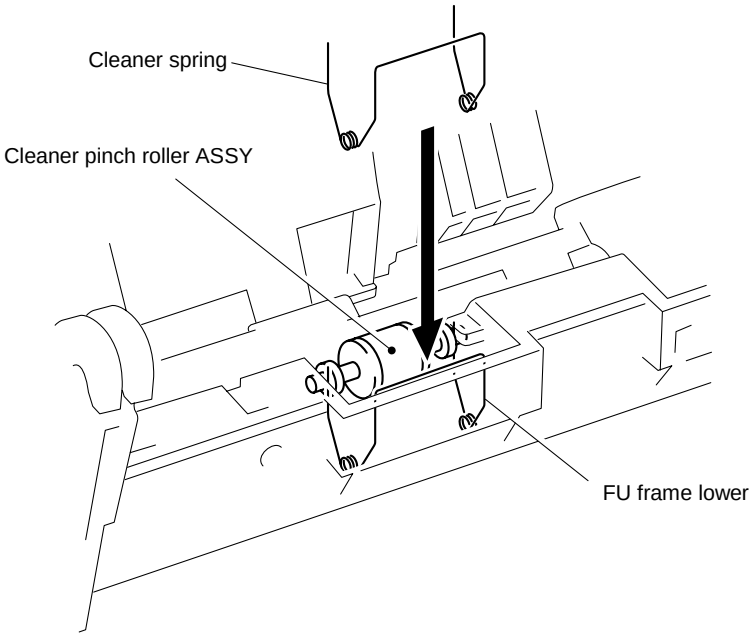


Fig. 4-75

(23) Disconnect the connector for the eject sensor harness from the thermistor relay PCB ASSY.

(24) Release the eject sensor harness from the three hooks.

(25) Remove the bind B M3x10 Taptite screw, and then remove the eject sensor PCB ASSY.

(26) Remove the bind B M3x10 Taptite screw, and then remove the thermistor relay PCB ASSY.

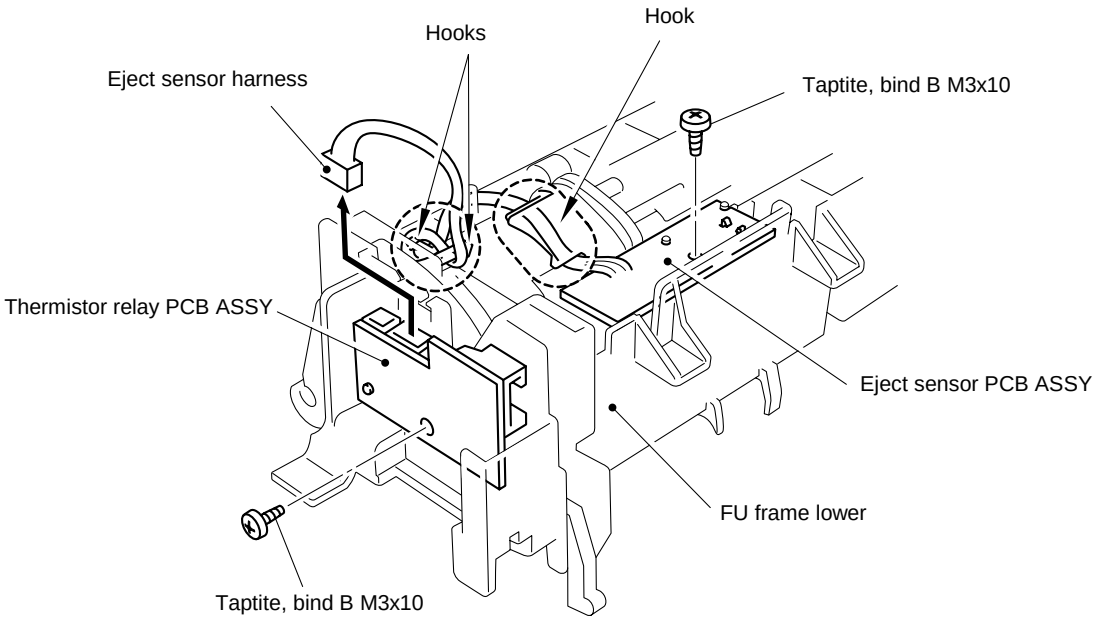


Fig. 4-76

(27) Remove the paper eject actuator and eject actuator spring.

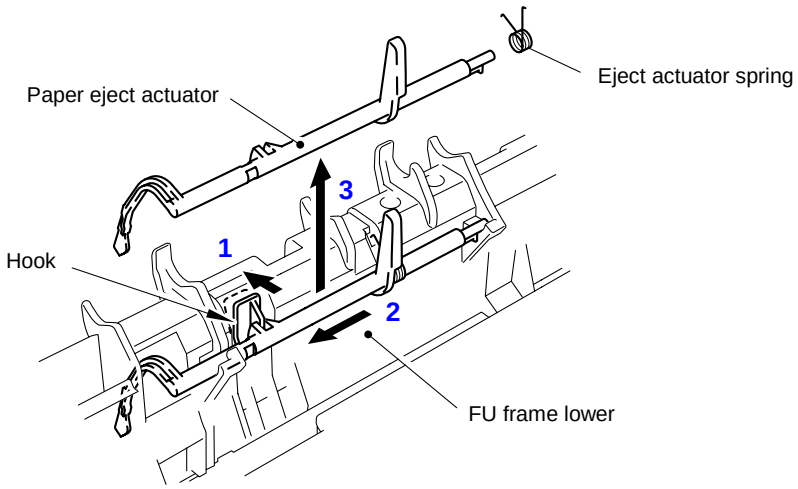


Fig. 4-77

NOTE:

When re-assembling the paper eject actuator and the eject actuator spring to the FU frame lower, ensure the paper eject actuator is seated correctly in the locating channel referring to the figure below;

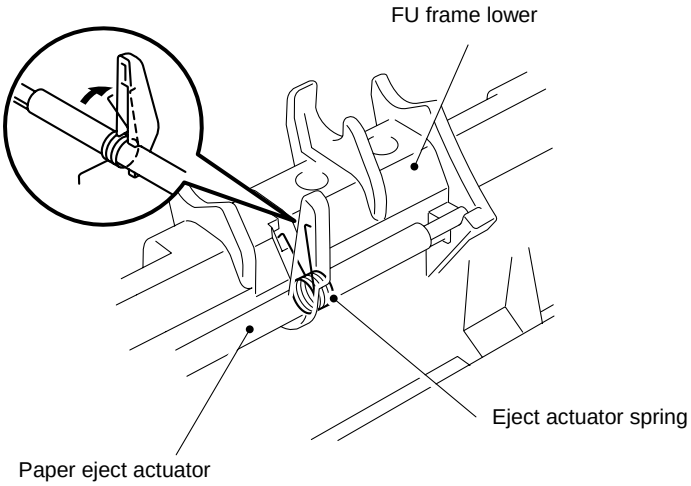


Fig. 4-78

(28) Disconnect the heater harness.

(29) Remove the four cup B M3x6 Taptite screws.

(30) Remove the four separate claw holder plate.

(31) Remove the four separate claw ASSY.

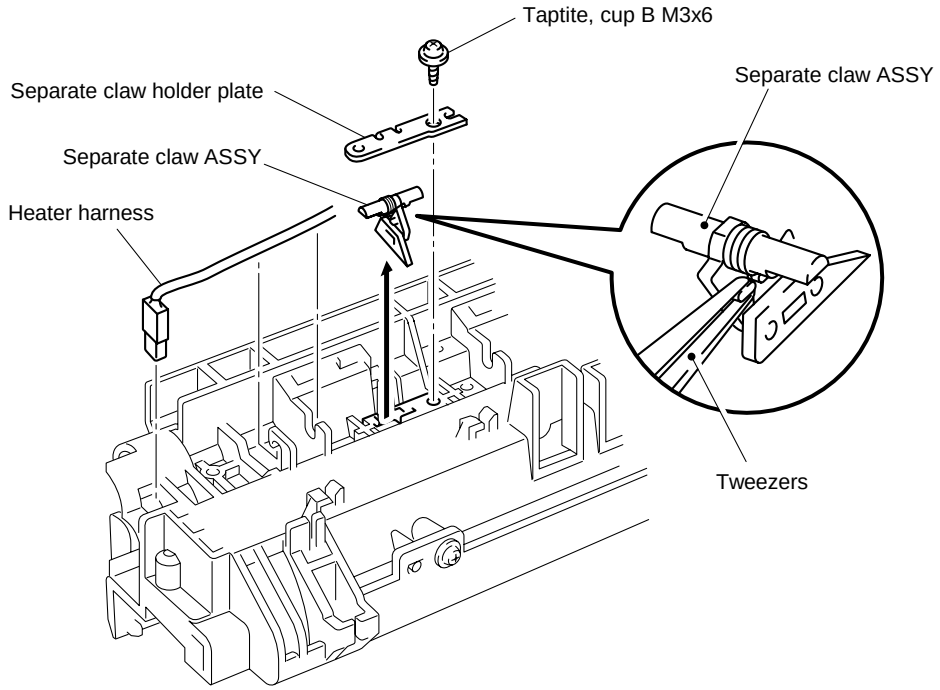


Fig. 4-79

3.15 Laser Unit

(1) Remove the filter, and then remove the cup S M3x8 Taptite screw and the air duct.

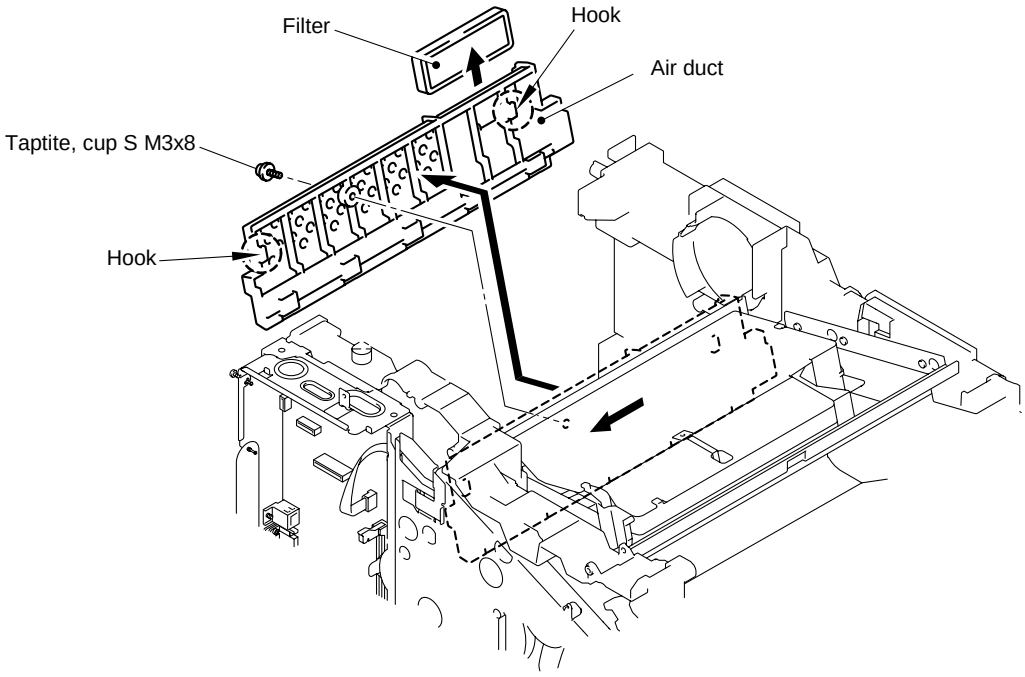


Fig. 4-80

(2) Disconnect the LD harness 5P from the laser unit.

(3) Disconnect the polygon motor harness and remove the spongy from the polygon motor harness.

(4) Remove the six cup S M3x8 Taptite screws, and then remove the laser unit.

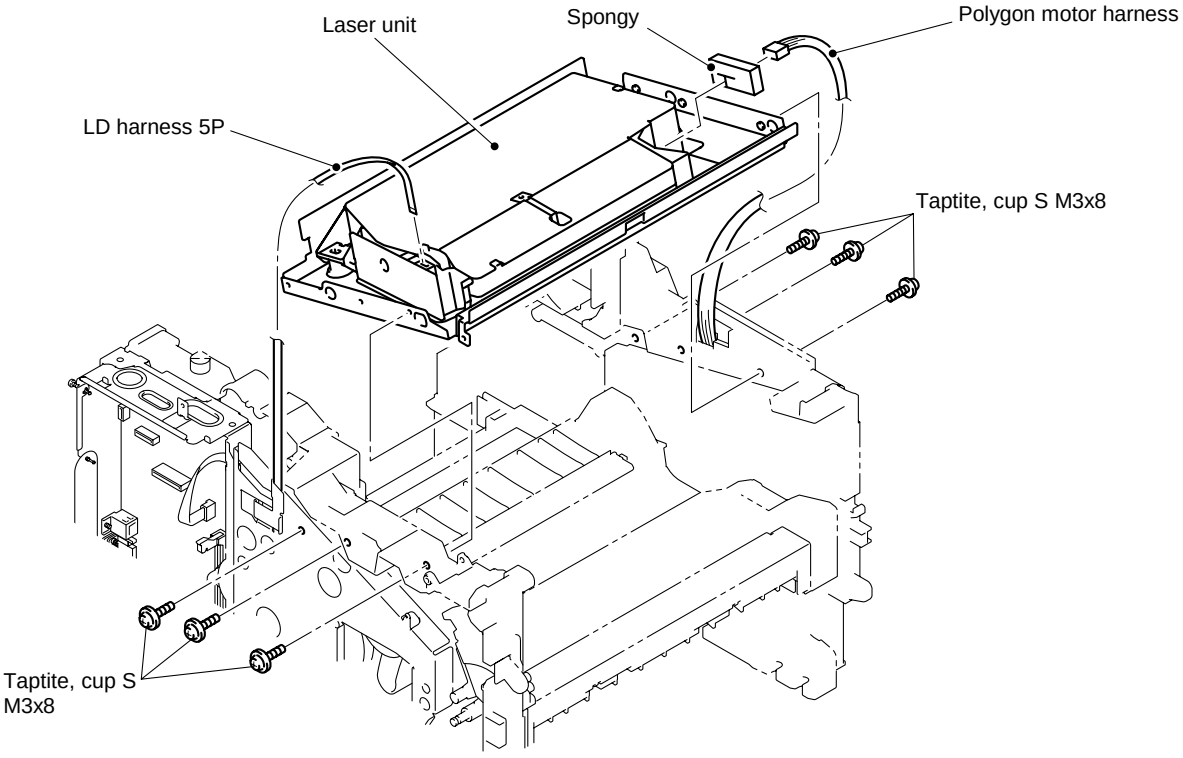


Fig. 4-81

(5) Remove the shutter arm C.

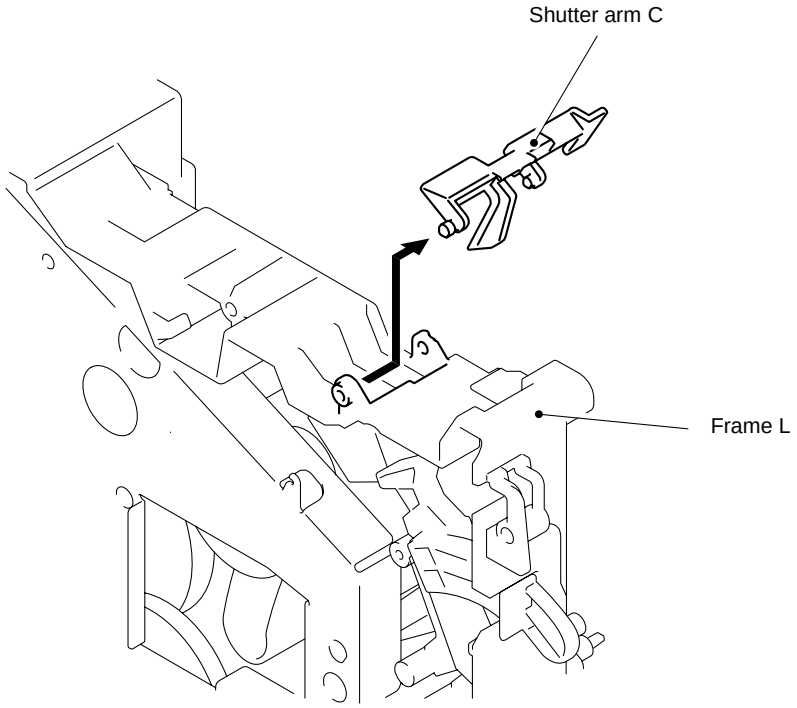


Fig. 4-82

3.16 Main PCB ASSY

(1) Disconnect the LD harness 5P.

(2) Disconnect the four connectors.

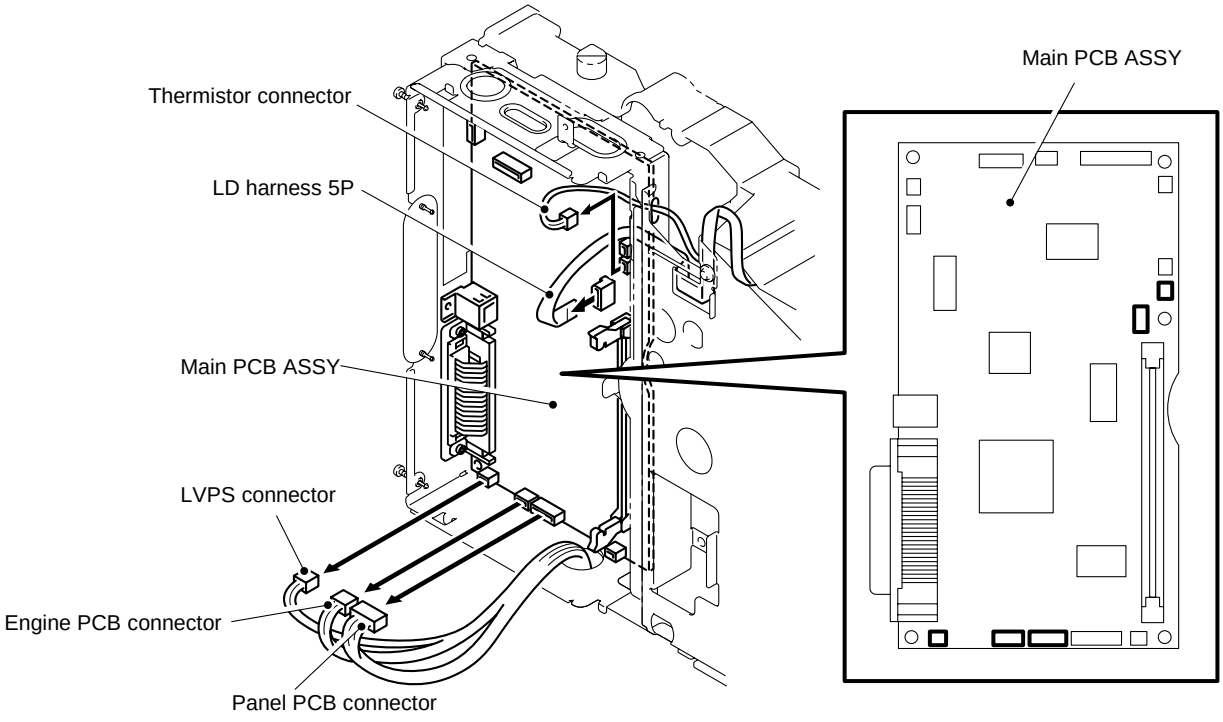


Fig. 4-83

(3) Remove the three pan M3x6 screws.

(4) Remove the five cup S M3x6 Taptite screws, and then remove the main PCB ASSY.

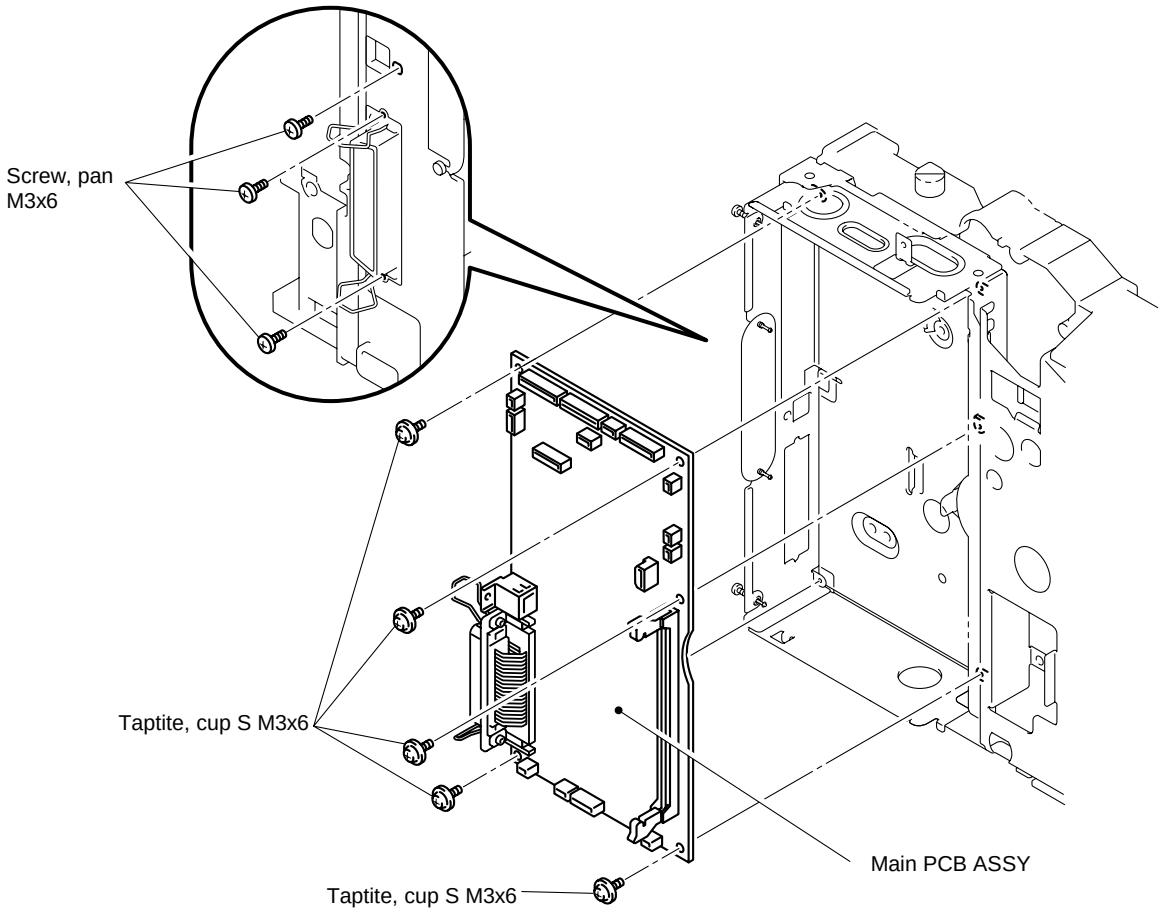


Fig. 4-84

NOTE:

After replacing the Main PCB, please perform the following operations.

- *Chapter 7 3.12 CIS Scanner Area Setting (Maintenance mode 55) (Refer to P7-20.)*
- *APPENDIX 1 EEPROM CUSTOMIZING CODES (Refer to A-1.)*
- *APPENDIX 2.1 INSTALING THE UPDATE DATA TO THE MACHINE (Refer to A-2.)*
- *APPENDIX 2.2 SETTING ID CODES TO MACHINES (Refer to A-4.)*

3.17 Base Plate / LV Insulation Sheet

(1) Remove the eight bind B M4x12 Taptite screws.

(2) Remove the four cup S M3x6 Taptite screws.

(3) Remove the pan (washer) M3.5x6 Taptite screw, and then remove the ground wire.

(4) Remove the base plate.

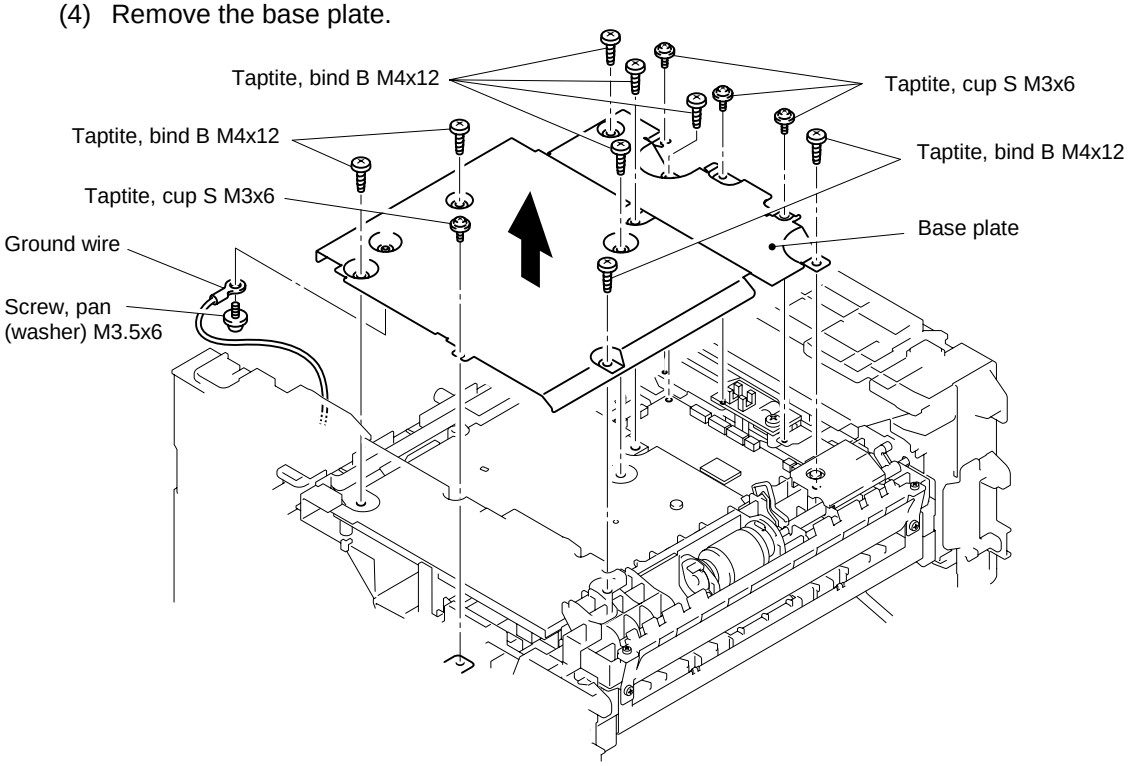


Fig. 4-85

(5) Remove the two bind B M4x12 Taptite screws, and then remove the LV insulation sheet.

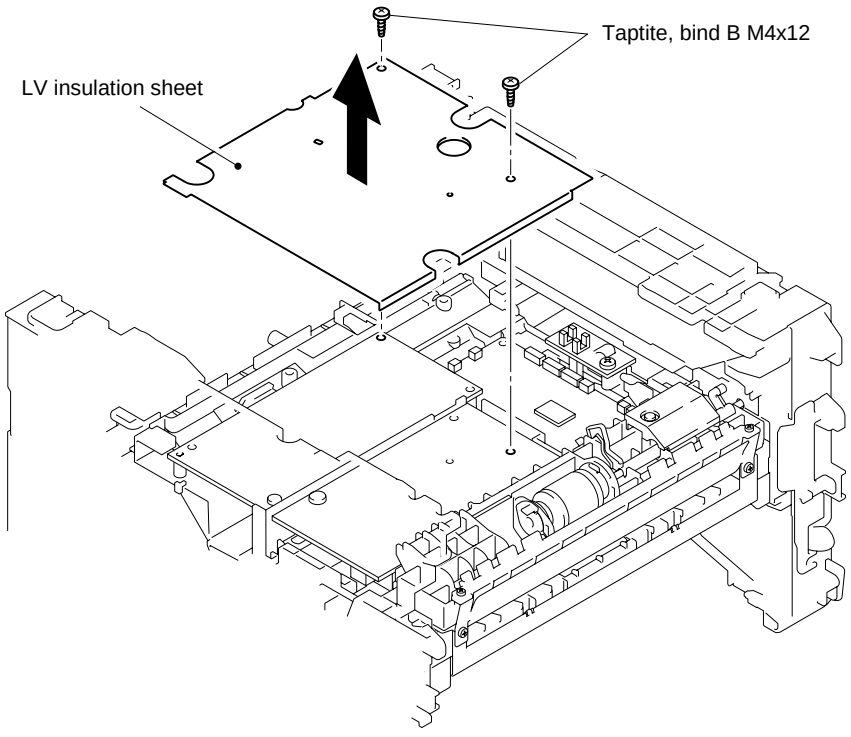


Fig. 4-86

3.18 Engine PCB ASSY

(1) Disconnect the connectors.

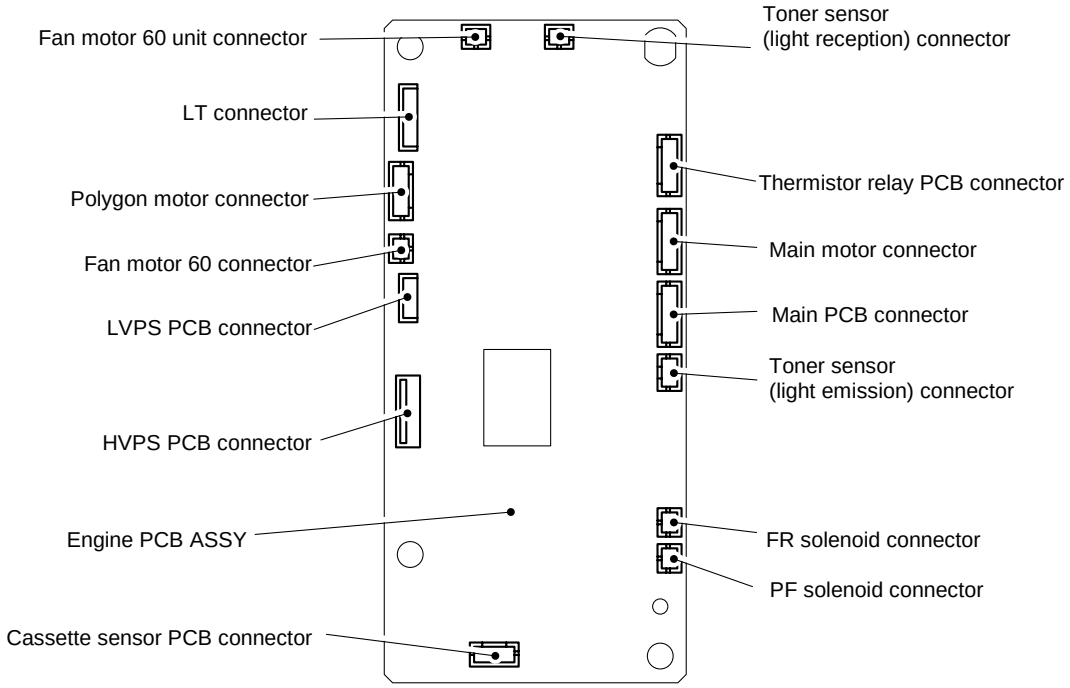


Fig. 4-87

(2) Remove the two bind B M4x12 Taptite screws, and then remove the engine PCB ASSY.

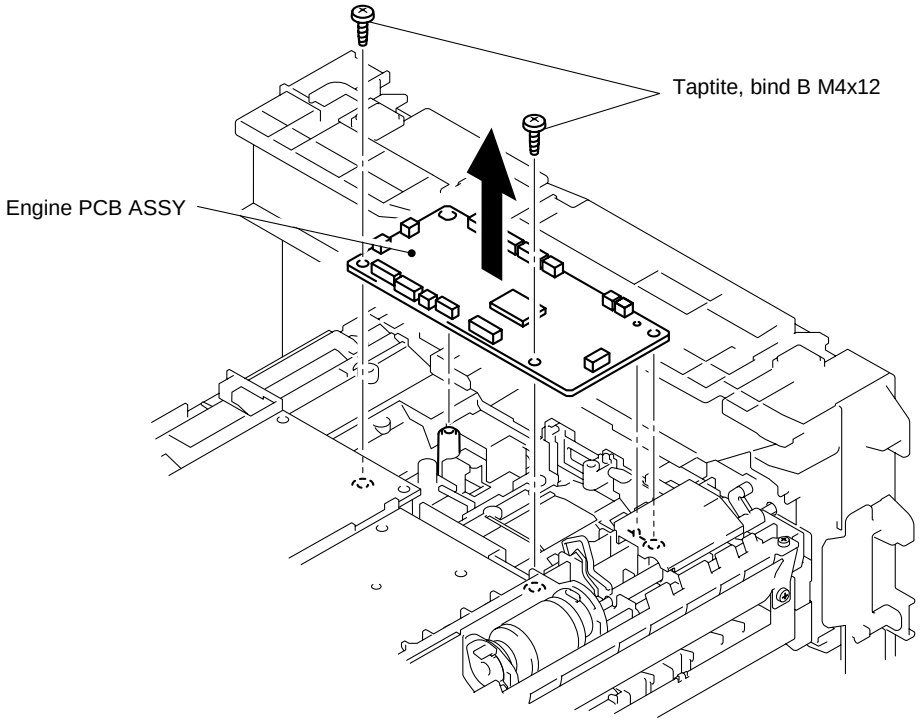


Fig. 4-88

3.19 High-voltage PS PCB ASSY

(1) Remove the bind B M4x12 Taptite screw, and then remove the high-voltage PS PCB ASSY.

(2) Disconnect the flat cable from the high-voltage PS PCB ASSY.

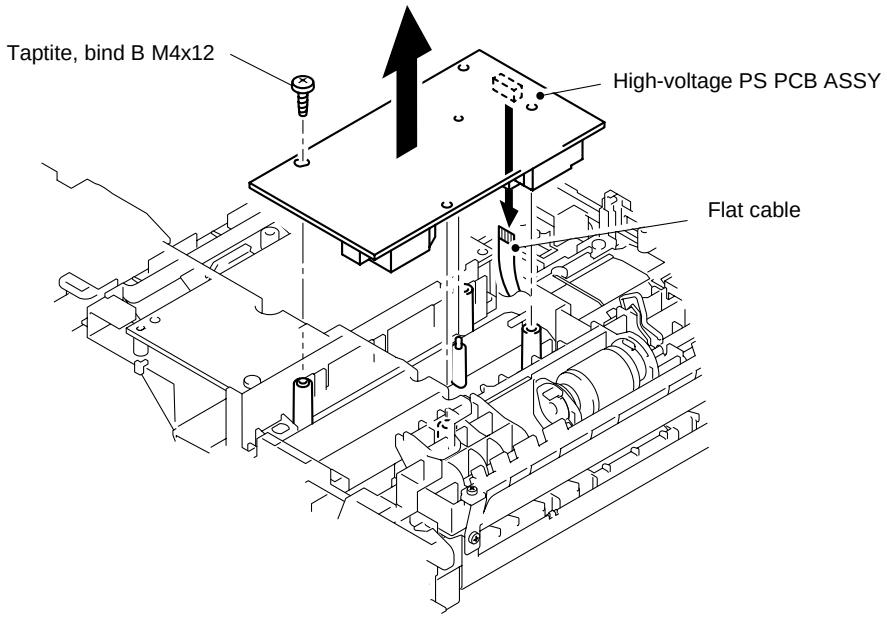


Fig. 4-89

3.20 Low-voltage PS PCB ASSY

(1) Remove the bind B M4x12 Taptite screw.

(2) Disconnect the three connectors from the low-voltage PS PCB, and then remove the low-voltage PS PCB ASSY.

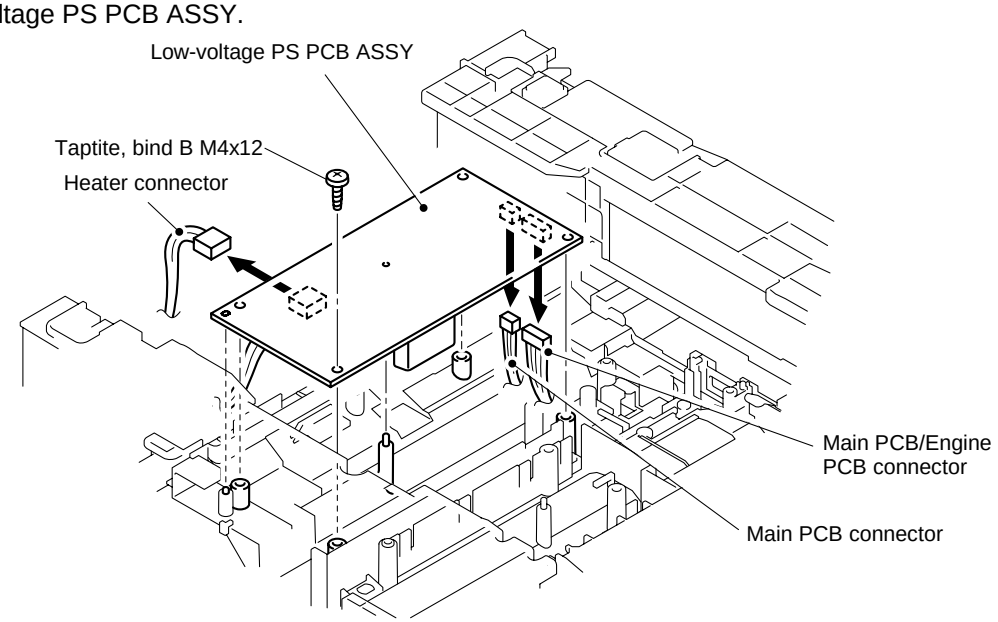


Fig. 4-90

(3) Remove the two bind B M4x12 Taptite screws, and then remove the inlet holder.

(4) Remove the bind B M4x12 Taptite screw, and then remove the SW holder.

(5) Remove the fan motor 60 unit.

(6) Remove the low-voltage PS PCB.

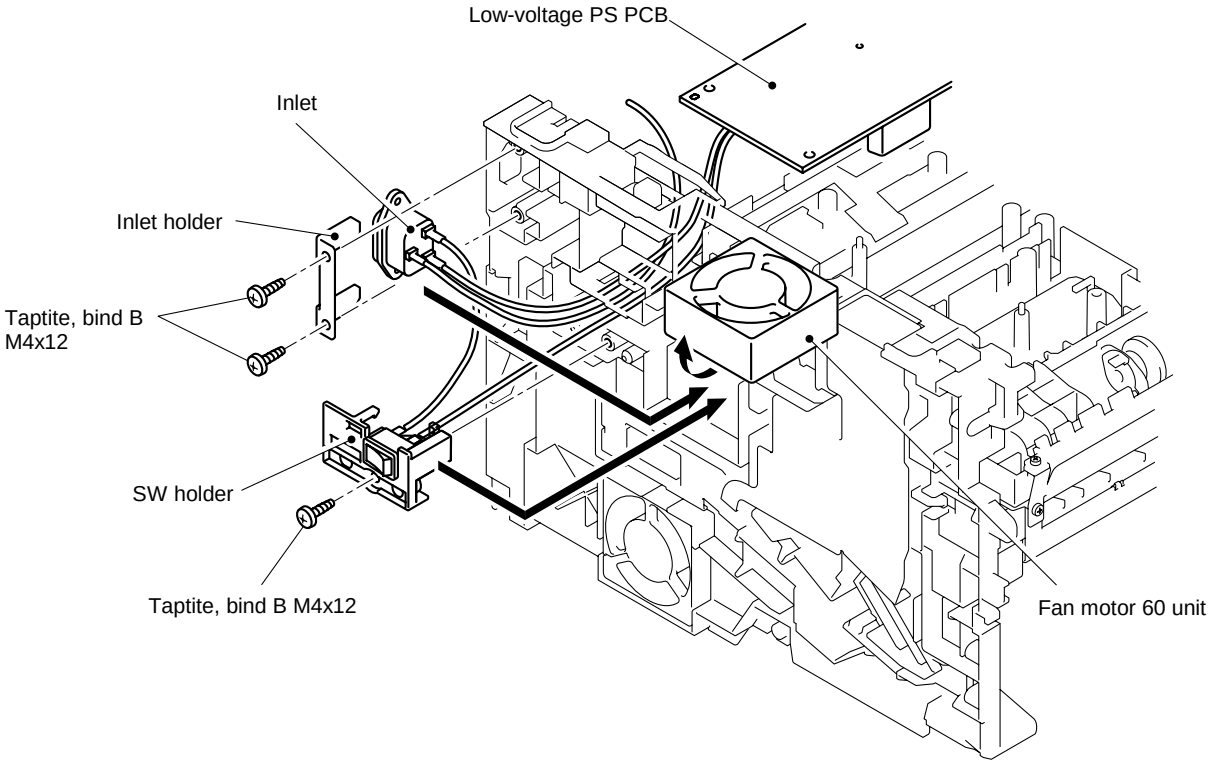


Fig. 4-91

Hint: Inlet Harness Installation Procedure

(1) Mount the inlet.

(2) Mount the fan motor 60 unit.

(3) Pull the inlet harness behind the fan motor 60 unit to the side of the SW holder to take up the slack. (Important!)

(4) Mount the SW holder.

3.21 Paper Feeder

(1) Remove the bush R.

(2) Remove the paper pick-up roller ASSY.

(3) Remove the two roller collars from the paper pick-up roller ASSY.

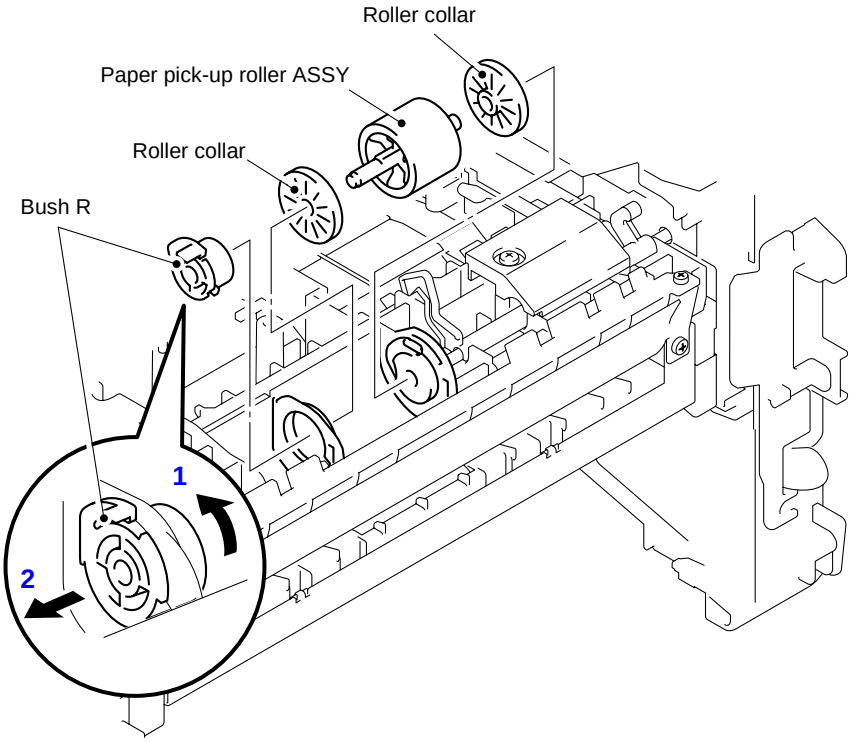


Fig. 4-92

(4) Remove the bind B M3x10 Taptite screw, and then remove the PE sensor cover.

(5) Remove the cassette sensor PCB ASSY.

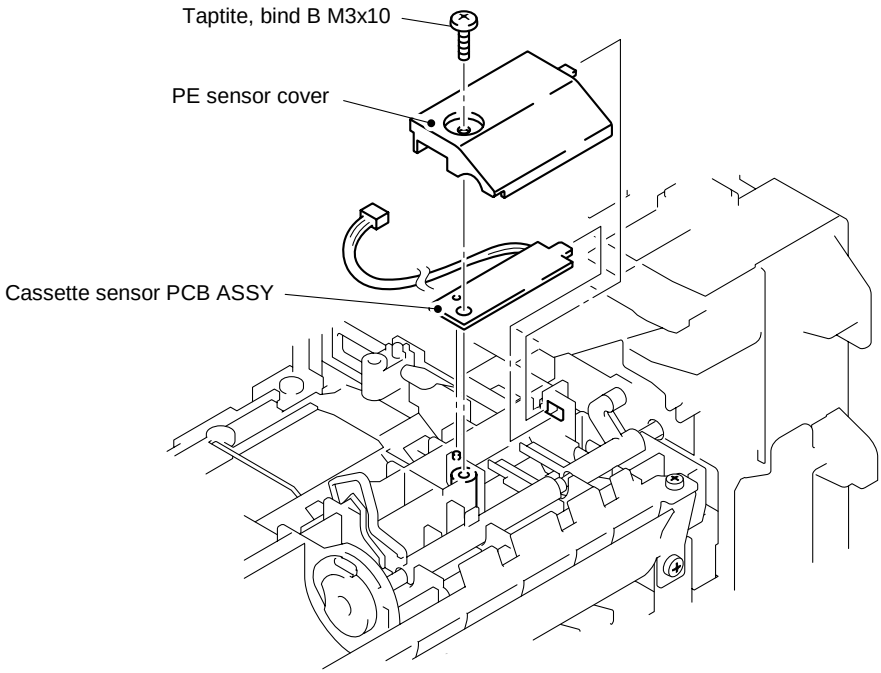


Fig. 4-93

(6) Remove the PE actuator and the CA actuator.

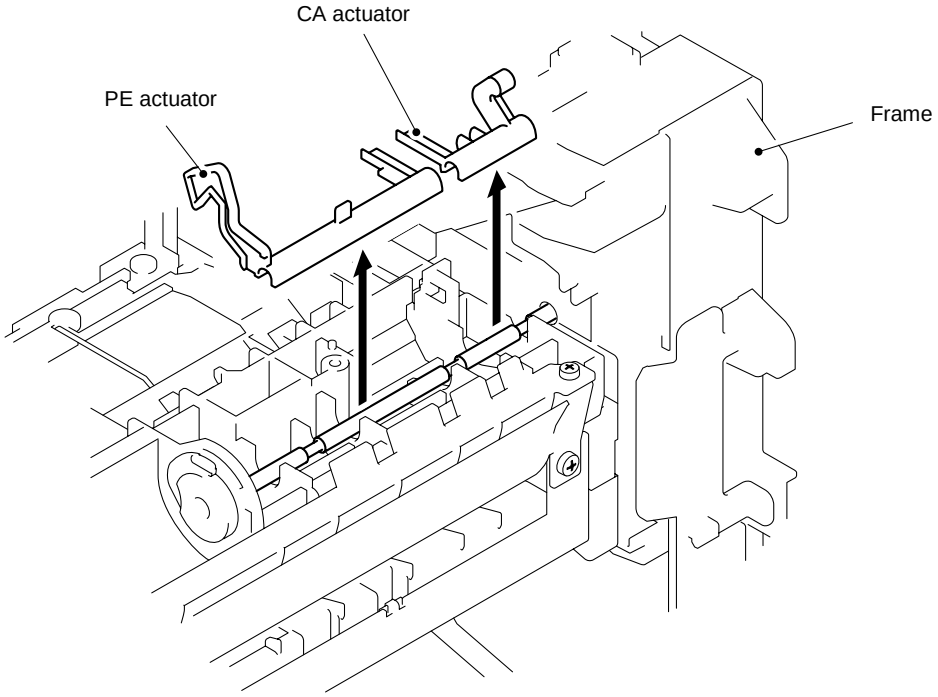


Fig. 4-94

(7) Remove the spring, extension P/R from the gear 63P/R.

(8) Remove the gear 63P/R.

(9) Remove the ground wire from the conductor bearing.

Hint:

Make sure to mount the extension spring P/R and the ground wire in proper positions upon assembly. If they are mounted in improper positions, tension fails to be applied to the sector gear 63 P/R, and it might cause a feeding failure.

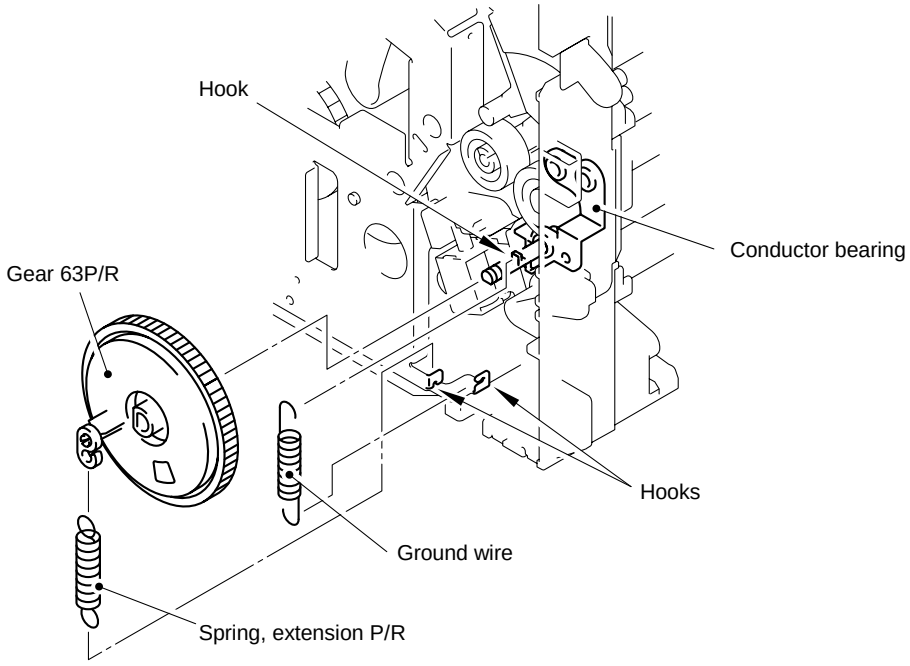


Fig. 4-95

(10) Remove the bush L from the P/R shaft.

(11) Remove the P/R shaft.

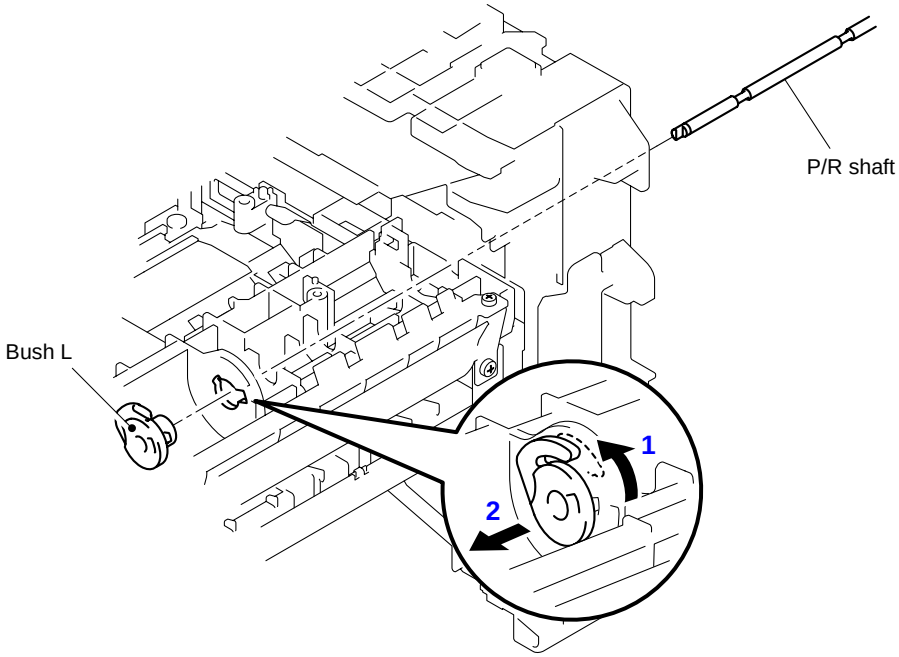


Fig. 4-96

(12) Remove the idle gear 22.

(13) Remove the middle roller gear.

(14) Remove the bind B M3x10 taptite screw and the conductor bearing.

(15) Remove the 1st F/R shaft.

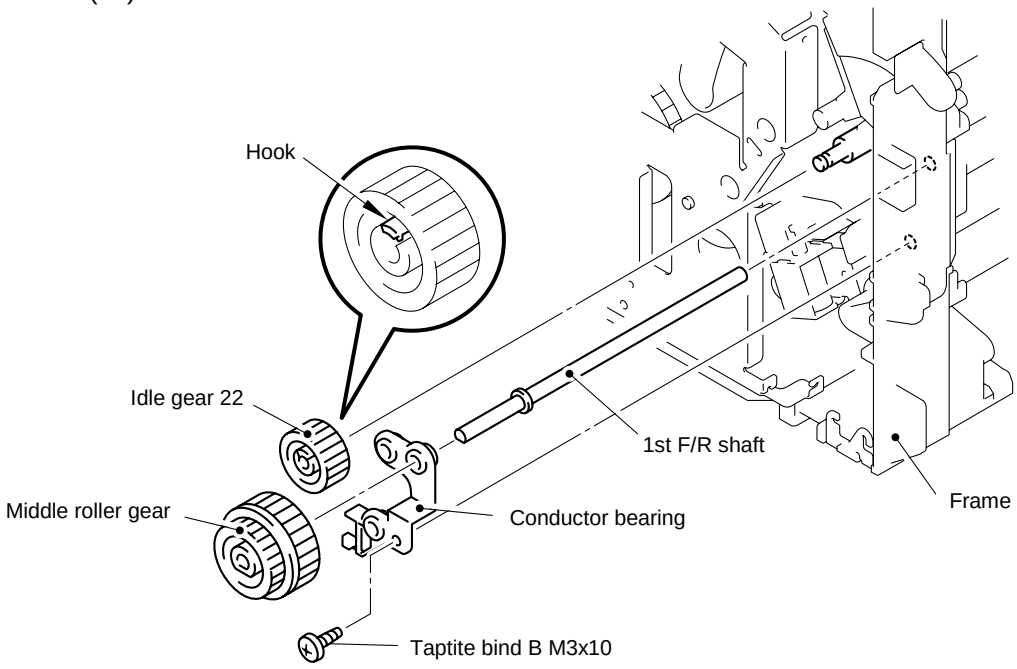


Fig. 4-97

(16) Remove the two cup S M3x6 Taptite screws and the four bind B M4x12 Taptite screws.

(17) Remove the front chute ASSY.

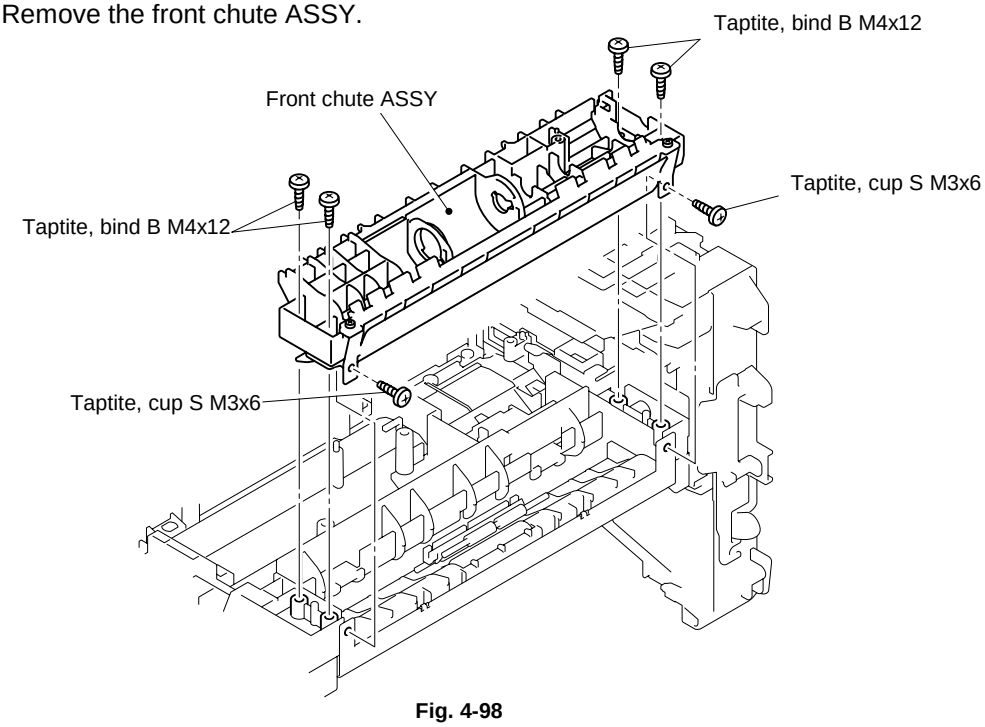


Fig. 4-98

(18) Remove the two shoulder taptite bind B M3x7.5 Taptite screws from front chute guide ASSY.

(19) Remove the front chute guide ASSY.

(20) Remove the front tray chute ASSY.

(21) Remove the roller 6, pressure roller shaft and roller 6 guide.

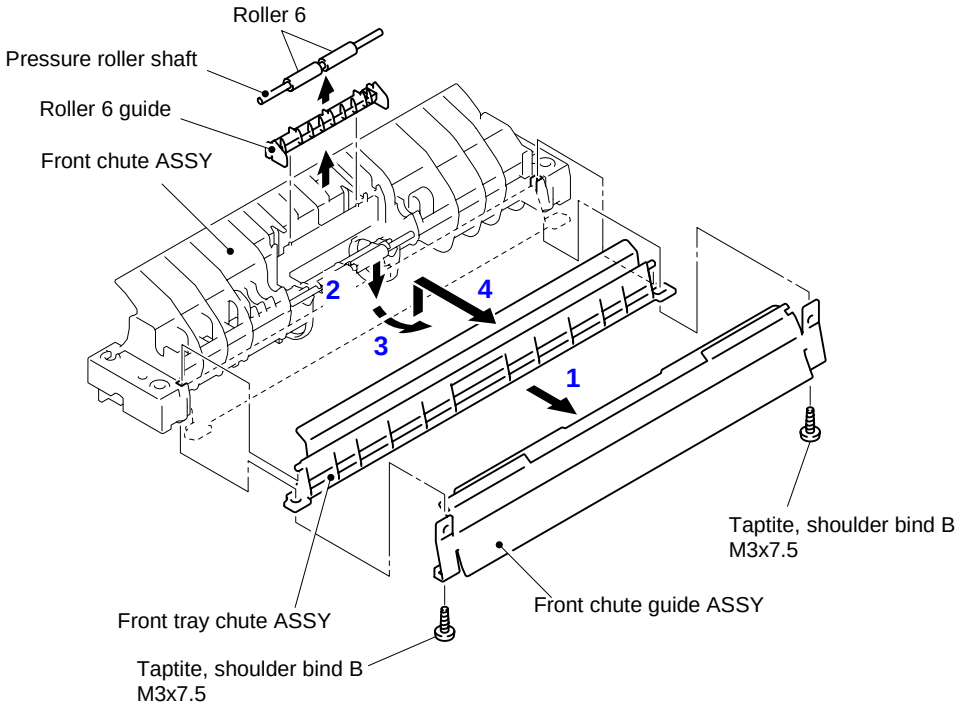


Fig. 4-99

(22) Remove the two bind B M4x12 Taptite screws, and then remove the chute 3.

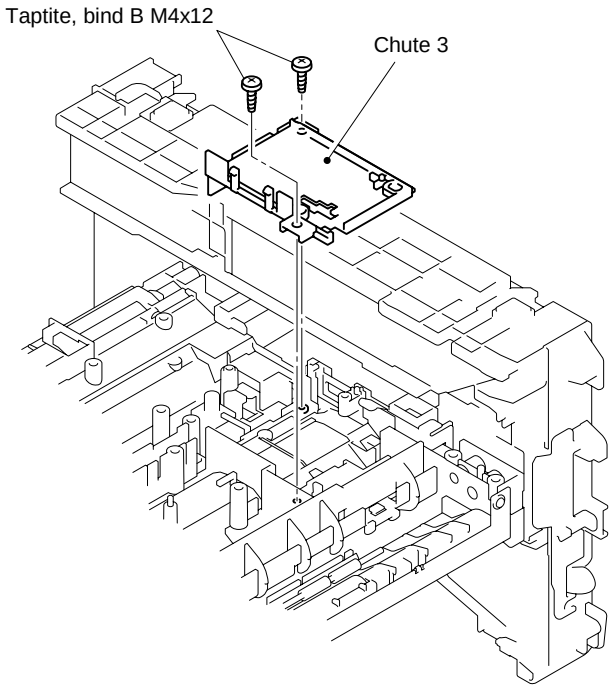


Fig. 4-100

(23) Remove the feed roller gear.

(24) Remove the bearing F/R.

(25) Remove the feed roller gear shaft.

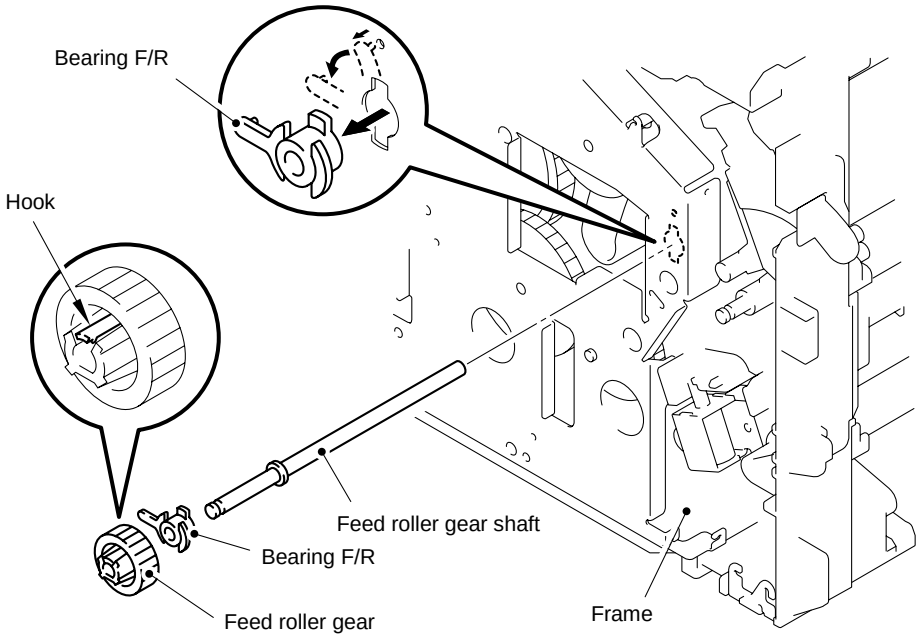


Fig. 4-101

(26) Release the hook of the bearing 5, and then slide the feed roller ASSY in the direction of the arrow.

(27) Remove the feed roller ASSY.

(28) Remove the joint 5 and the bearing 5 from the feed roller ASSY.

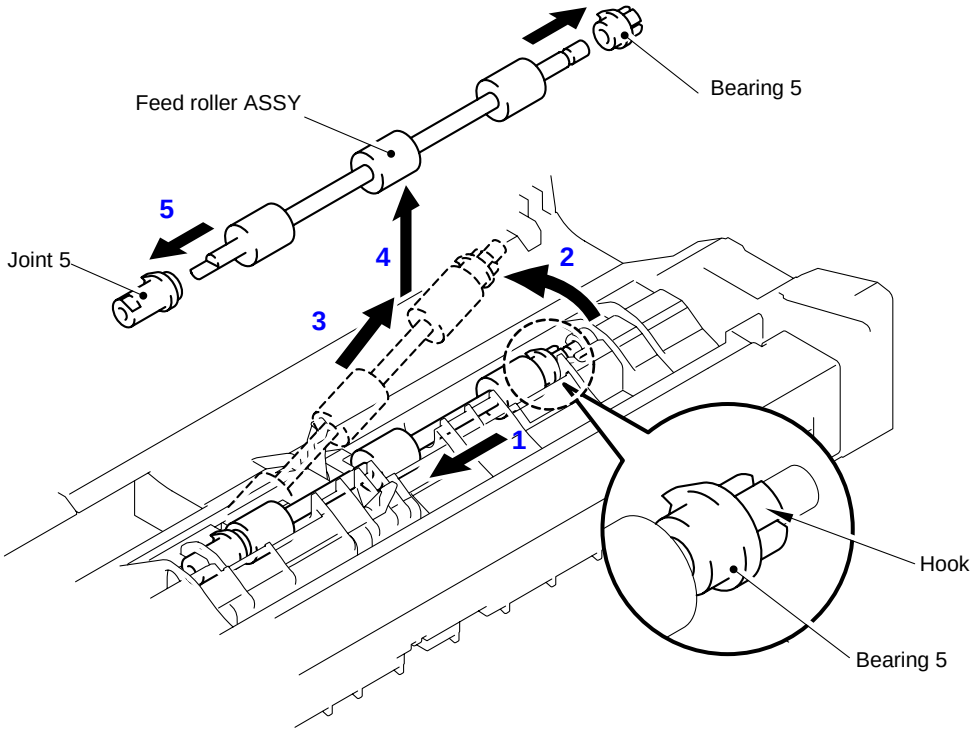


Fig. 4-102

NOTE:

Be careful that the different direction installation causes jam when you install joint 5.

(See the figure below.) If the joint 5 is mounted in a wrong orientation, it might cause a paper jam.

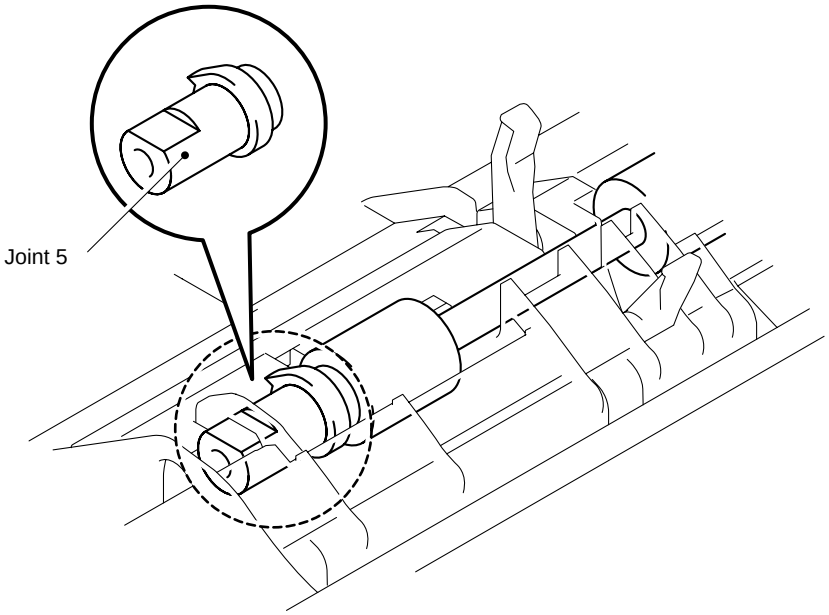


Fig. 4-103

(29) Remove the chute cover.

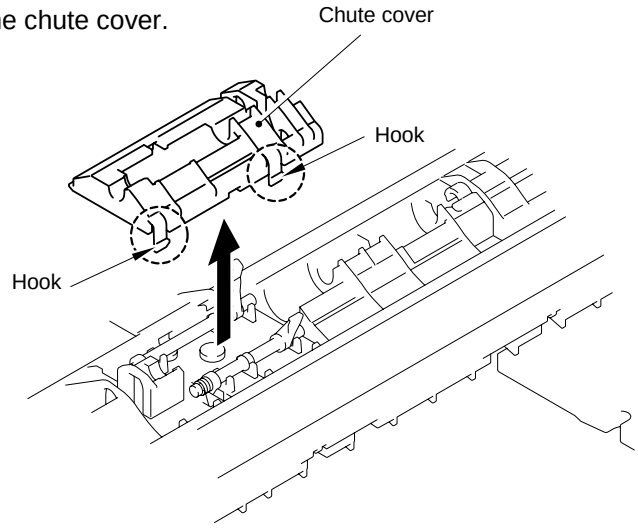


Fig. 4-104

(30) Remove the regist front actuator and regist front actuator spring.
(31) Remove the regist rear actuator and regist rear actuator spring.

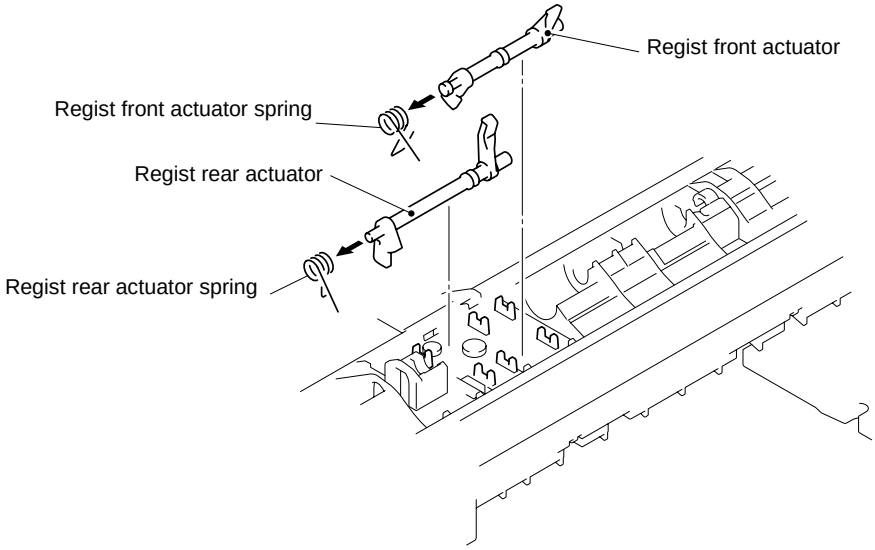


Fig. 4-105

NOTE:

When assembling the regist front actuator and the regist rear actuator, set the spring as shown in the figure.

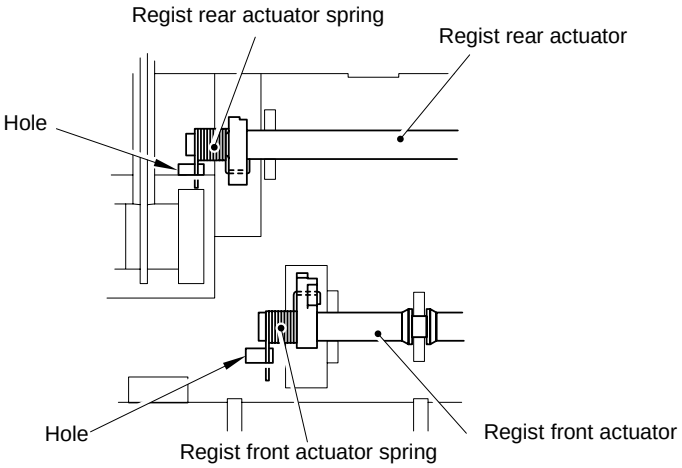


Fig. 4-106

3.22 Frame L / Drive Unit

(1) Remove the main PCB sheet from the main frame L unit.

(2) Remove the four bind B M4x12 Taptite screws.

(3) Remove the two bind B M3x10 Taptite screws, and then remove the main frame L unit.

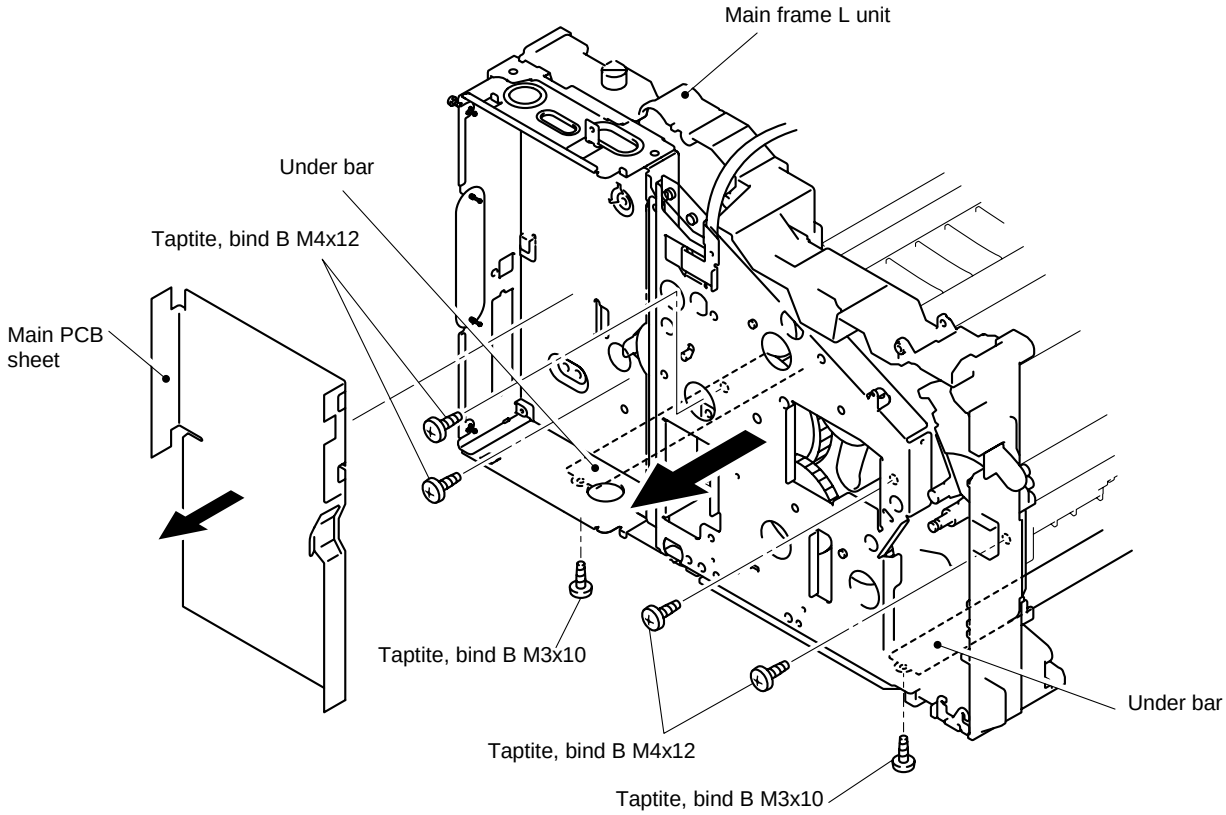


Fig. 4-107

(4) Remove the cup S M3x6 Taptite screw, and then remove the ground spring.
(5) Remove the six bind B M4x12 Taptite screws.
(6) Remove the cup S M3x6 Taptite screw.
(7) Remove the cup S M3x6 Taptite screw, and then remove the sub gear plate.
(8) Remove the LD harness 5P from the drive unit.
(9) Remove the drive unit.
(10) Disconnect the connector for the main motor harness from the main motor ASSY.

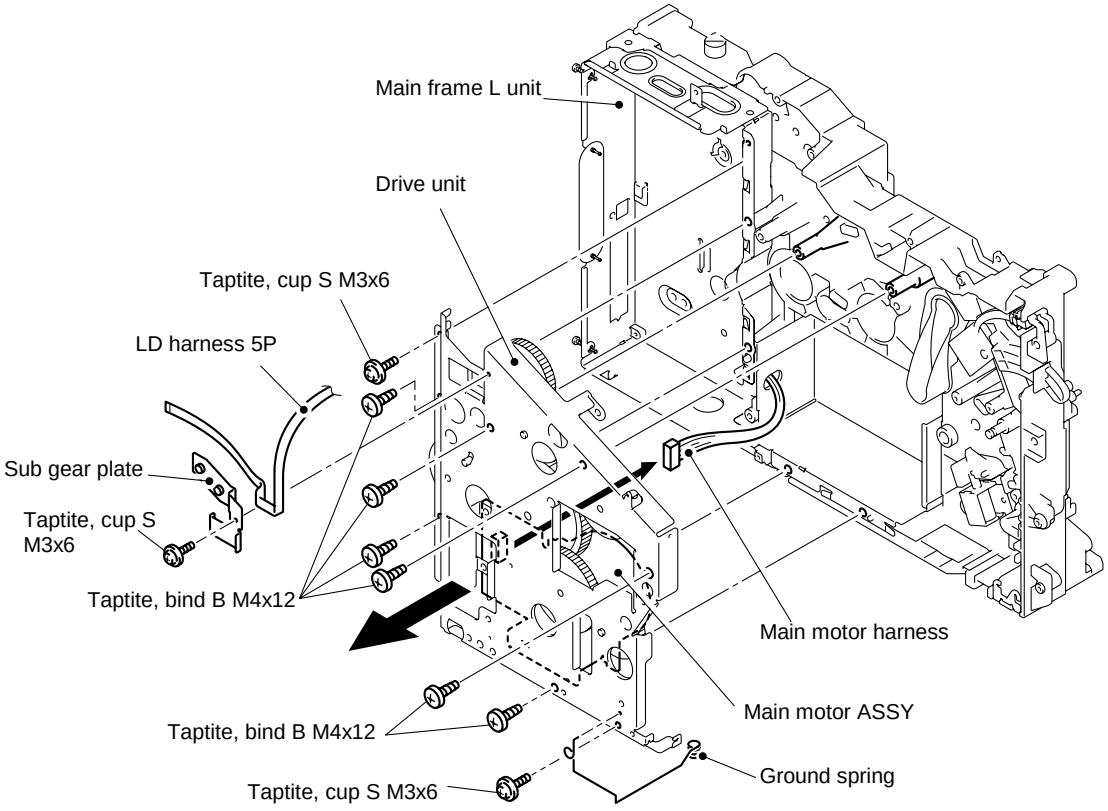


Fig. 4-108

(11) Remove the four cup S M3x6 Taptite screws, and then remove the main motor ASSY.

(12) Remove the develop joint and joint spring from the drive unit.

(13) Release the two hooks from the develop joint, and remove the joint stopper.

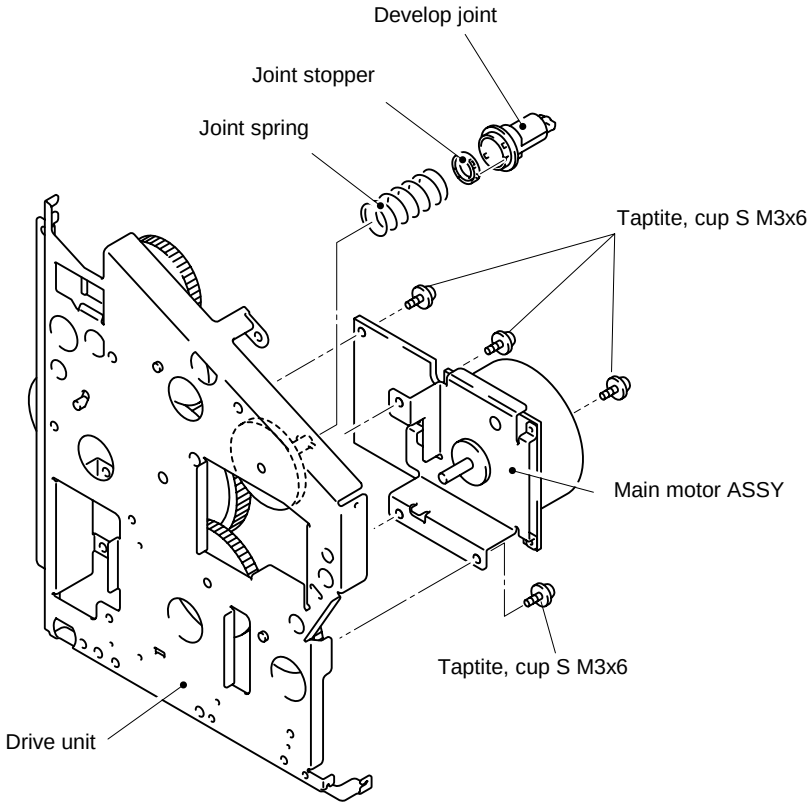


Fig. 4-109

(14) Remove the gear 40/54Y, gear 17 planetary, gear 45 arm F/R and gear 20 center F/R from the frame L.

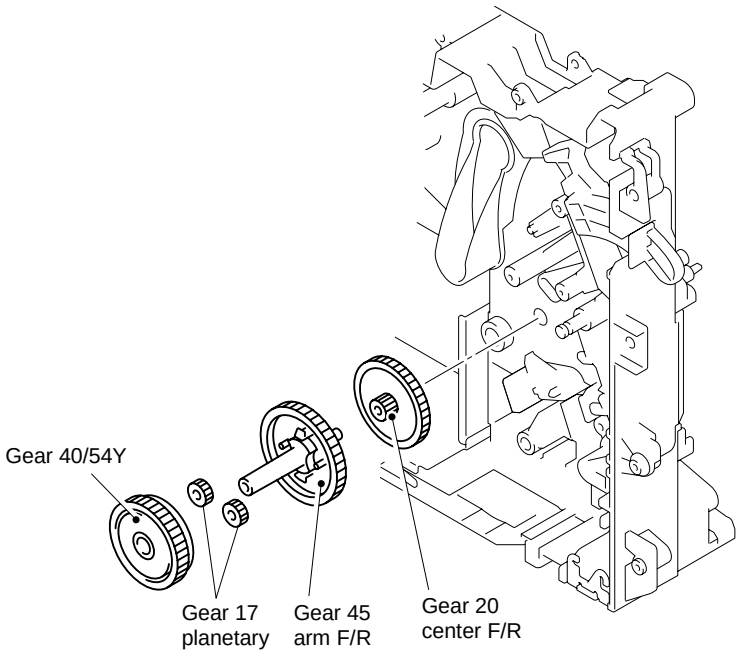


Fig. 4-110

(15) Remove the bind B M3x10 Taptite screw.

(16) Remove the P/R solenoid ASSY, the P/R solenoid lever and the solenoid release spring P/R.

(17) Remove the bind B M3x10 Taptite screw.

(18) Remove the F/R solenoid ASSY and solenoid release spring F/ R.

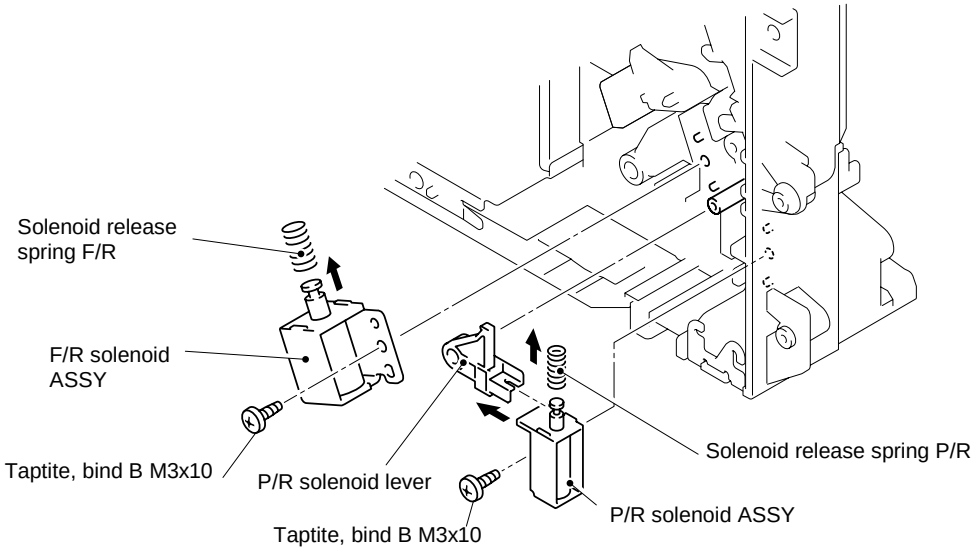


Fig. 4-111

(19) Disconnect the connector from the document cover sensor.

(20) Remove the bind B M3x10 Taptite screw.

(21) Remove the toner LED PCB unit ASSY.

(22) Remove the sensor clip.

(23) Remove the document cover sensor from the frame L.

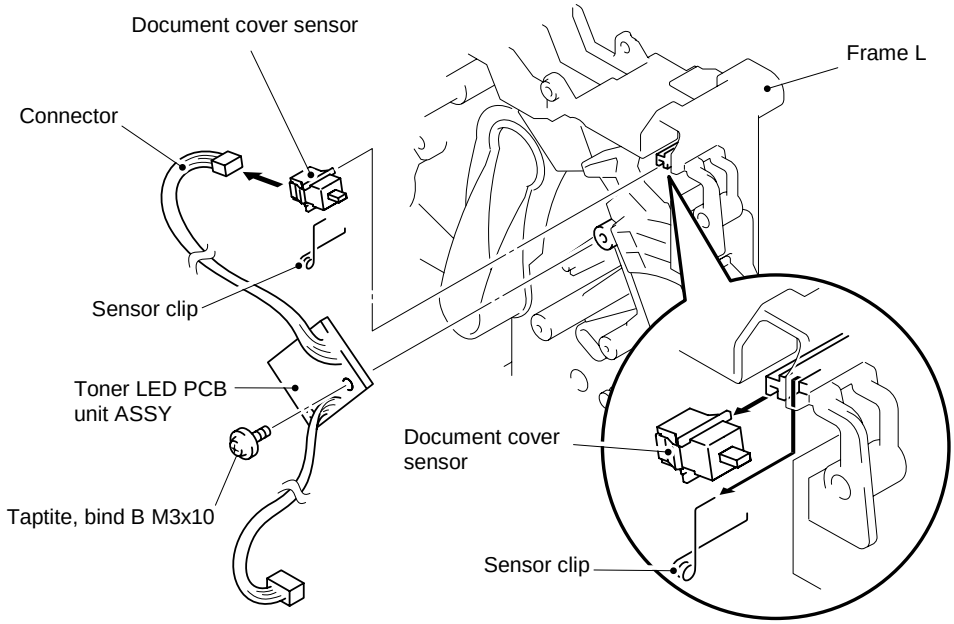


Fig. 4-112

3.23 Thermistor ASSY

(1) Remove the thermistor ASSY.

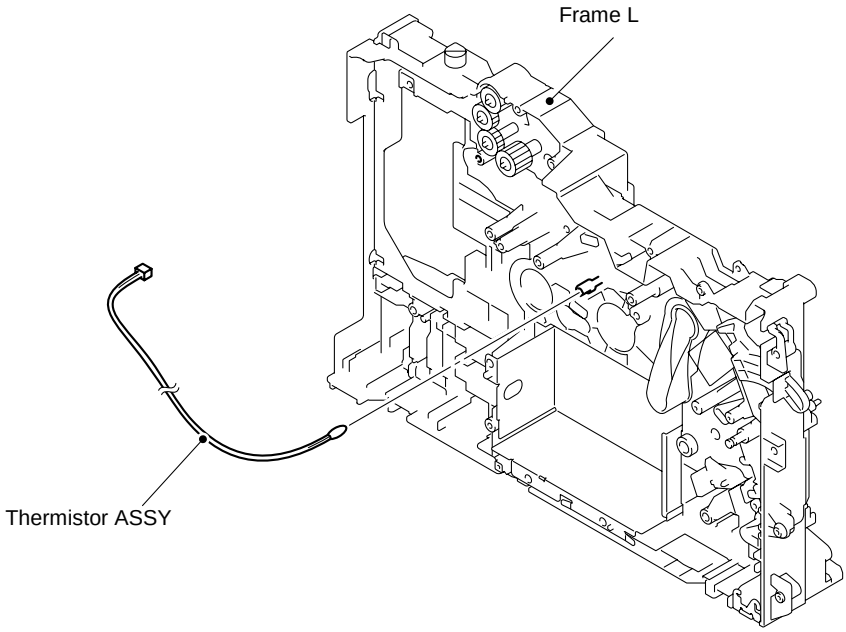


Fig. 4-113

3.24 Fan Motor 60 Unit LV / Fan Motor 60 Unit

(1) Remove the fan motor 60 unit LV and the fan motor 60 unit.

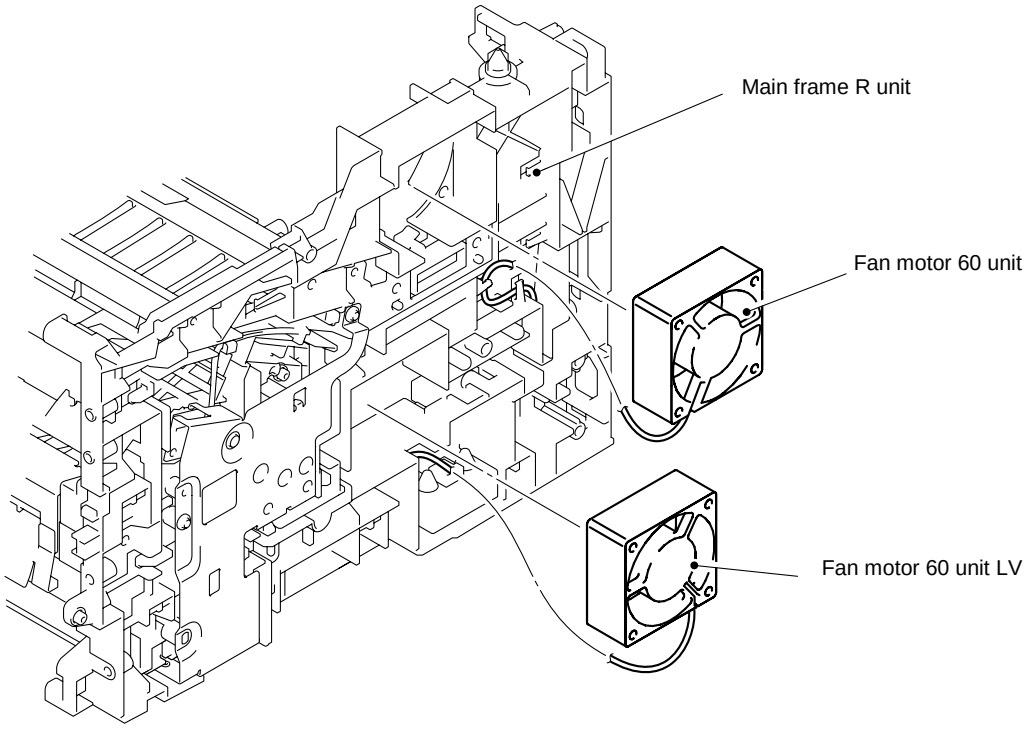


Fig. 4-114

3.25 Frame R

(1) Remove the four bind B M4x12 Taptite screws.

(2) Remove the cup S M3x16 Taptite screw.

(3) Remove the two cup S M3x6 Taptite screws.

(4) Remove the main frame R unit.

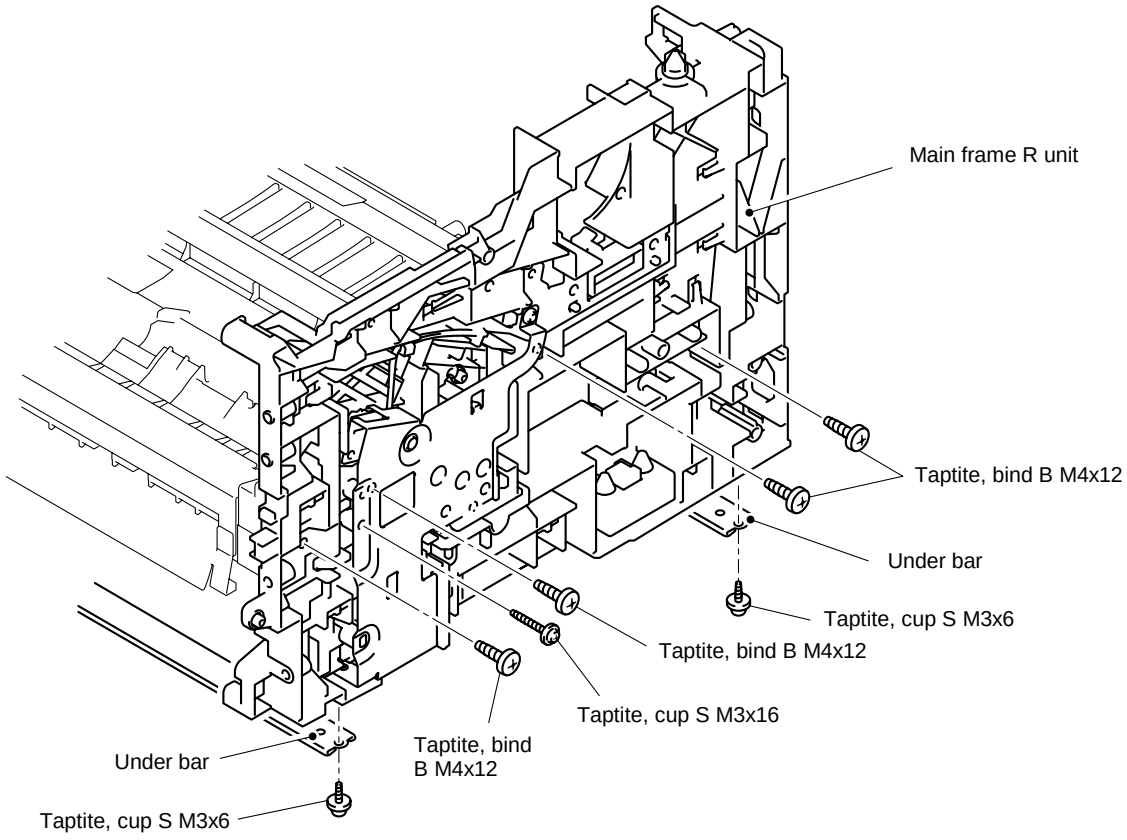


Fig. 4-115

(5) Remove the two bind B M4x12 Taptite screws.

(6) Remove the cup S M3x6 Taptite screw.

(7) Remove the drum spring R.

(8) Remove the FG plate.

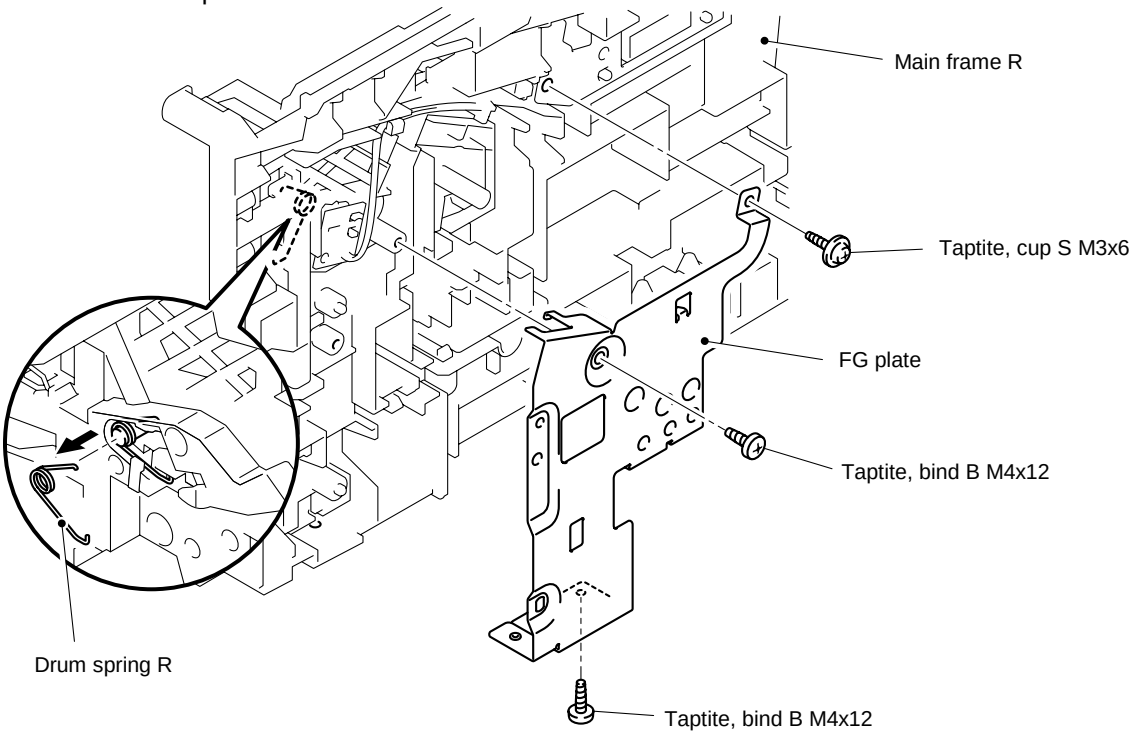


Fig. 4-116

(9) Remove the toner sensor PCB unit (Light reception).

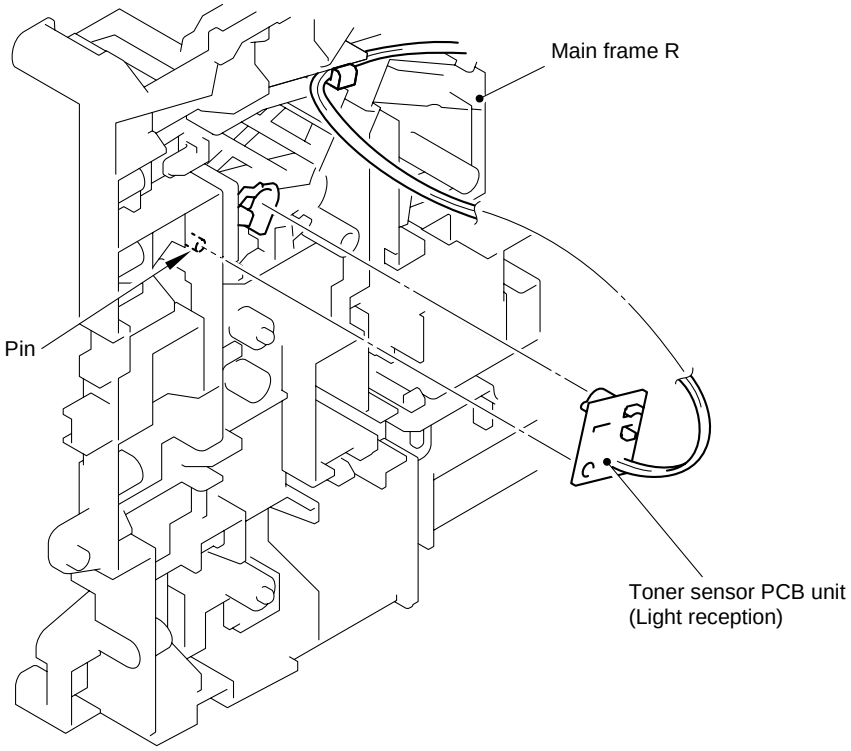


Fig. 4-117

4. PACKING

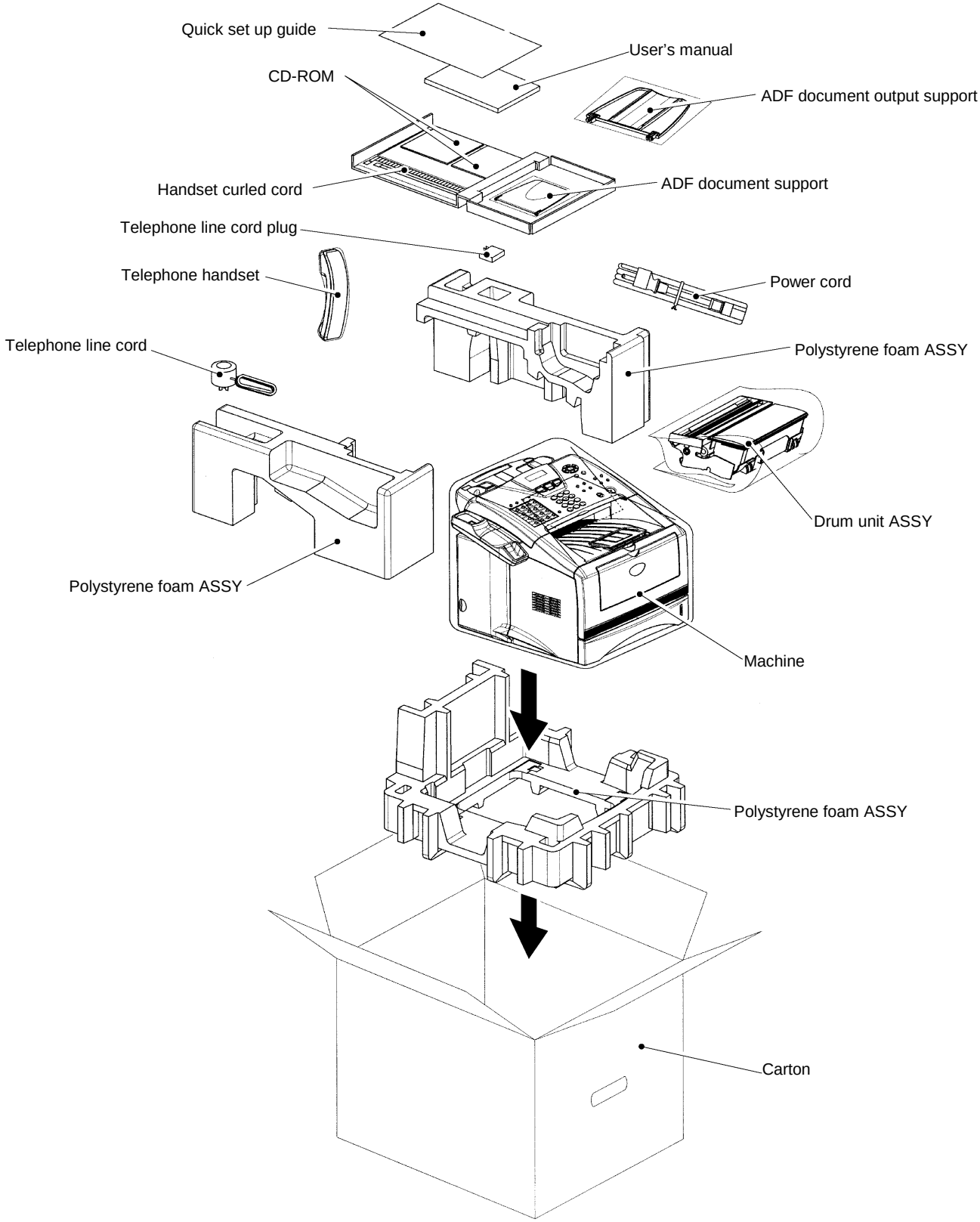


Fig. 4-118

5. GUIDELINES FOR LEAD FREE SOLDER

Information on Manually Repairing PCB Soldered with Lead-Free Solder
This document provides information on how to correctly make manual repairs to a printed circuit board (PCB) soldered with lead-free solder.

1. Characteristics of lead-free solder

   Melting point higher than that of conventional tin-lead solder
   (Lead-free solder: approx. 220'C, Conventional tin-lead solder: approx. 180'C)
   Relatively poor solder wettability and spread (difficult to wet and spread), and hard
   Appearance (dull and grainy surface) different from that of conventional solder
   Relatively poor wettability, rough surface (bumps are likely to be formed), and solder dragging
   Poor solder elevation
   Poor thermal conductivity and heat resistant (difficult to melt)

2. Metal composition & wire solder

   The metal composition of lead-free solder allowed for use on PCBs for Brother's products is following.

LF Indication		Compositon	Manufacturer	Origin	Name
1		Sn/Ag/Cu	Nihon Genma	Japan	DHB-RMA3 NP303
H	only Component-side	Sn/Ag/Cu	Nihon Genma	Japan	DHB-RMA3 NP303

   We use wire solder which is indicated by digit after LF indication on PCB.
   Wire solder made in the contries except Japan are under investigation,and will be evaluated.

3. Appearance quality criteria

   The appearance of the surface of portions soldered with lead-free solder is basically the same as that for those soldered with conventional lead-tin solder, except for the following points.
   1) The surface of a portion soldered with lead-free solder is dull and not smooth.
   2) Shrinkage cracks can be observed on the surface of a portion soldered with lead-free solder. (They can be observed using a magnifying glass with approx. 10x magnification.)

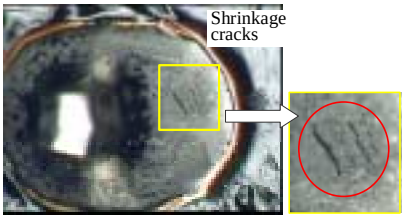


Figure 1 Shrinkage Cracks

4. Identification of lead-free solder on PCBs

   For PCBs that use lead-free solder, "LF" is indicated by silk-screen printing or attaching a label. "LF" stands for lead free and indicates that the PCBs bearing such an indication have been soldered with lead-free solder. A digit is given in a box following "LF" if produced by silk-screen printing or follows "LF" without a box on an attached label, the digit indicating the metal composition and wire solder.

5. Precautions for hand soldering operations
   1) Soldering operations using lead-free solder are basically the same as those using tin-lead solder, however, due to the lead-free solder's characteristics of being difficult to melt, wet, and spread, as well as being hard, a soldering iron needs to be applied for a longer period of time than when soldering with conventional tin-lead solder. While soldering is being performed, it must be confirmed that the lead-free solder is spreading. When solder needs to be added when repairing PCBs, the solder must only be added after sufficiently melting the previously soldered area. When poor soldering is repaired, the solder of the poorly soldered area must be sufficiently removed and lead-free solder newly supplied.
   2) Before starting soldering operations, it must be determined whether or not the PCB has an "LF" indication. If the PCB has an "LF" indication, lead-free solder corresponding to the digit following "LF" must be used. Conventional solder including lead (tin-lead solder) must not be used on a PCB that has an "LF" indication. (Use of tin-lead solder on a PCB having an "LF" indication is prohibited.)
   3) A soldering iron for exclusive use with lead-free solder must only be used; a soldering iron used for soldering with tin-lead solder must not be used with lead-free solder. The use of soldering irons designed for lead-free solder is desirable (see "7. Soldering iron" below).
   4) The requirement for the temperature of the soldering iron’s tip is the same as that for soldering using conventional solder; the temperature of the soldering iron's tip must not be raised even though the melting point of the lead-free solder is higher. The temperature of the soldering iron's tip is restricted to the temperature that the component to be soldered can resist. It should be noted that the temperature that the components to be soldered with lead-free solder can resist has not increased even though the melting point of the solder has.
   5) A soldering iron must be correctly applied.
      Even though the melting point of the solder has increased, soldering operations must be performed with the soldering iron’s tip at the same temperature as prescribed before. Therefore, heat needs to be effectively applied from the tip of the soldering iron to the base metal. For effective heat application, the shape of the soldering iron's tip and application of the soldering iron (position and angle relative to the base metal) need to be more strictly controlled than before.
   6) The soldered point must be left as it is after the soldering iron is removed for a period of time longer than that required when soldering is performed with conventional solder.
      The amount of heat applied to the base metal increases due to the higher melting point of the lead-free solder, and the base metal is heated to higher temperatures. Consequently, it takes time for the melted solder to cool and to solidify and, therefore, the soldered area must be left as it is after the soldering iron is removed for a longer period of time.
   7) A localized ventilation system and gloves are required for soldering operations.
      Lead-free solder does not contain the toxic substance lead, however, inhalation of the fumes may adversely affect the health of workers. The silver contained in lead-free solder is also a toxic substance, though it is not as toxic as lead, and, therefore, a localized ventilation system and gloves are required for lead-free solder soldering operations, as required for those with conventional solder.

6. Soldering irons

   When soldering is performed manually using lead-free solder, a soldering iron that has little reduction in its temperature needs to be used. This refers to a soldering iron that has a smaller degree of decrease in the temperature at the soldering iron's tip, such as when the soldering iron is applied to the base metal or solder is supplied, and the temperature is soon returned to the specified temperature.
   With soldering operations using lead-free solder, the requirement for the temperature of the soldering iron's tip is the same as that for conventional solder, however, the melting point of lead-free solder is higher than that of conventional solder so productivity will decrease with conventional soldering irons.
   Some tool manufacturers sell soldering irons designed for lead-free solder and that can maintain the productivity of the soldering operations.
   The soldering irons used at BIL are model no. 941 manufactured by HAKKO and M6-SIC-40 manufactured by BONKOTE. The prices of these soldering irons for use with lead-free solder are three to four times higher than those for conventional soldering irons with a temperature controller built in.

7. No mixing of different solders

   When repairs are made on a PCB with an "LF" indication on it, lead-free solder with the same metal composition, which is expressed by the digit following "LF", must be used on a single PCB. For a PCB with an "LF" indication on it, neither tin-lead solder nor lead-free solder with a different metal composition must be used.

Compatible solder for each countries are listed below. Solders are freely available from each manufacturer. Visit the web site below for more detail.

Countries	Manufacturer	Origin	Name	Web site
For Japan, UK, Finland, Germany, France, Sweden	ALMIT	JAPAN	KR-19 SH RMA LFM-48	http://www.almit.com
For World wide except Australia, New Zealand	KESTER	U.S.A.	KESTER245 KESTER285	http://www.kester.com
For Worldwide	AIM	CANADA	CASTIN RMA2	http://www.aimsolder.com

6. SCREW TORQUE LIST

1. Main Body

No.	Parts code	Parts name	Location	Pcs.	Tightening torque N·m (Kgf·cm)
1	087320-616	Taptite, cup S M3x6	NCU PCB ASSY	2	0.686 ±0.098 (7 ±1)
			NCU shield cover	1	
			NCU shield plate	2	
2	087320-616	Taptite, cup S M3x6	Main PCB ASSY	5	0.686 ±0.098 (7 ±1)
3	0023000-633	Screw, pan M3x6	Main PCB centronics	2	0.49 ±0.098 (5 ±1)
4	LM2119001	Screw, pan M3x6	Main PCB USB	1	0.49 ±0.098 (5 ±1)

2. Cover

No.	Parts code	Parts name	Location	Pcs.	Tightening torque N·m (Kgf·cm)
1	085412-216	Taptite, bind B M4x12	Inner chute	4	0.784 ±0.098 (8 ±1)
			Joint cover front L	2	
			Joint cover front R	2	
2	087311-016	Taptite, cup S M3x10	Driver PCB ASSY	3	0.392 ±0.049 (4 ±0.5)
3	087320-616	Taptite, cup S M3x6	Driver PCB shield	1	0.686 ±0.098 (7 ±1)
4	085412-216	Taptite, bind B M4x12	Joint cover ASSY	4	0.784 ±0.098 (8 ±1)
			Side cover R	3	
			Side cover L	4	
			Rear cover R	2	
			Rear cover L	2	
			Driver PCB access cover	1	
5	087310-815	Taptite, cup B M3x8	LF ground spring	1	0.294 ±0.053 (3 ±0.5)
6	087311-016	Taptite, cup B M3x10	HS holder	2	0.588 ±0.098 (6 ±1)

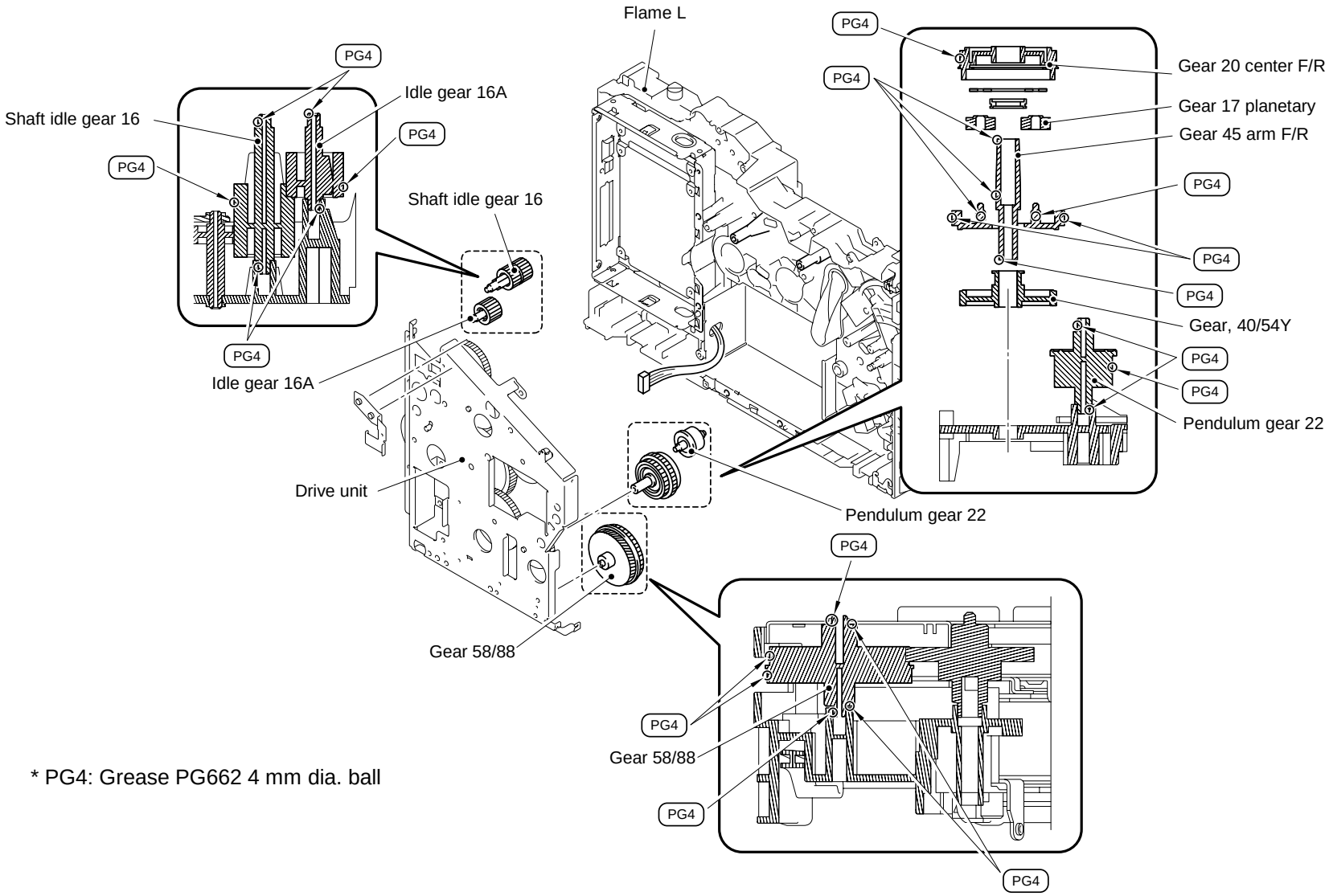
3. Document Scanner

No.	Parts code	Parts name	Location	Pcs.	Tightening torque N·m (Kgf·cm)
1	0A4300-605	Screw, pan (S/P washer) M3x6	Document scanner	1	0.686 ±0.098 (7 ±1)
2	087311-016	Taptite, cup B M3x10	Document chute ASSY	4	0.588 ±0.098 (6 ±1)

4. Panel

No.	Parts code	Parts name	Location	Pcs.	Tightening torque N·m (Kgf·cm)
1	087310-815	Taptite, cup B M3x8	Panel PCB ASSY	2	0.588 ±0.098 (6 ±1)
			Panel rear cover	3	
2	087310-615	Taptite, cup B M3x6	Spring plate front	1	0.392 ±0.098 (4 ±1)

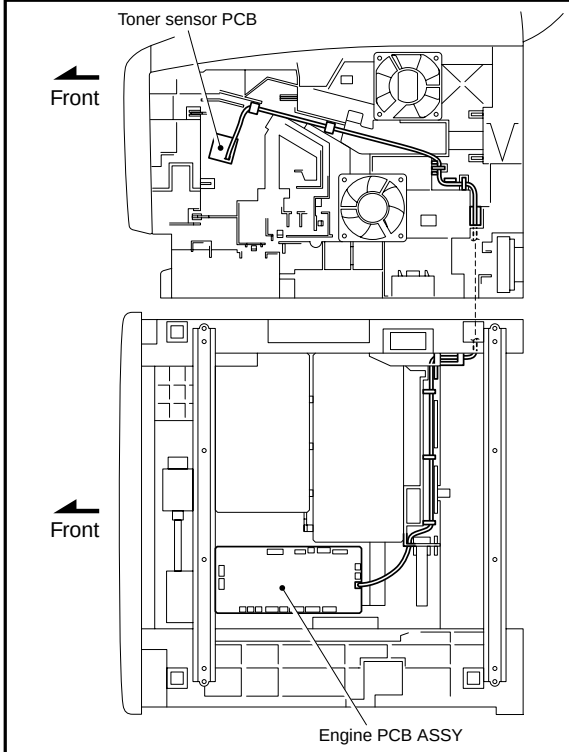
7. LUBRICATION



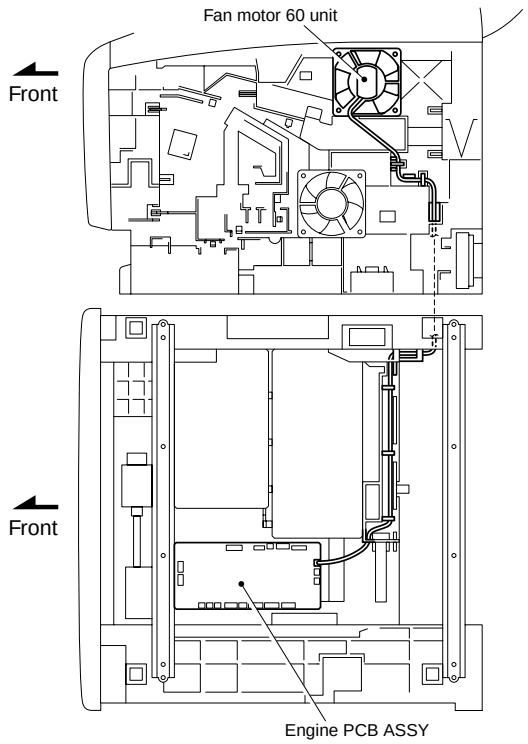
* PG4: Grease PG662 4 mm dia. ball

8. HARNESS ROUTING

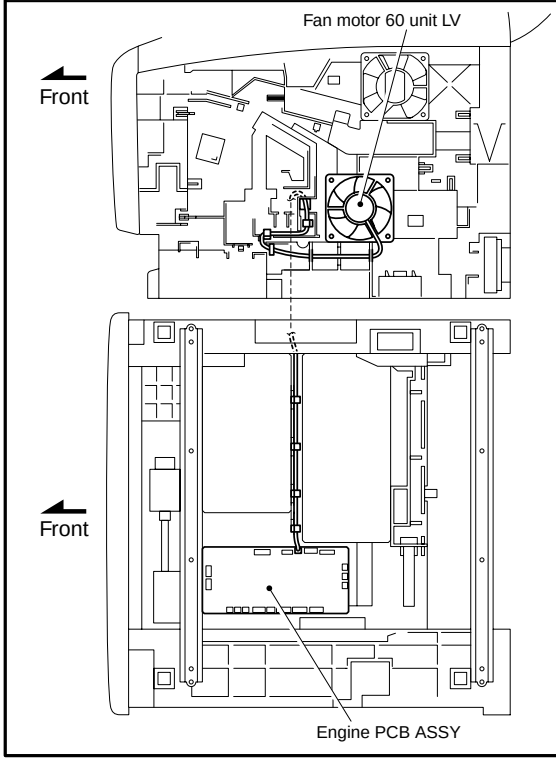
1 ・Toner sensor PCB



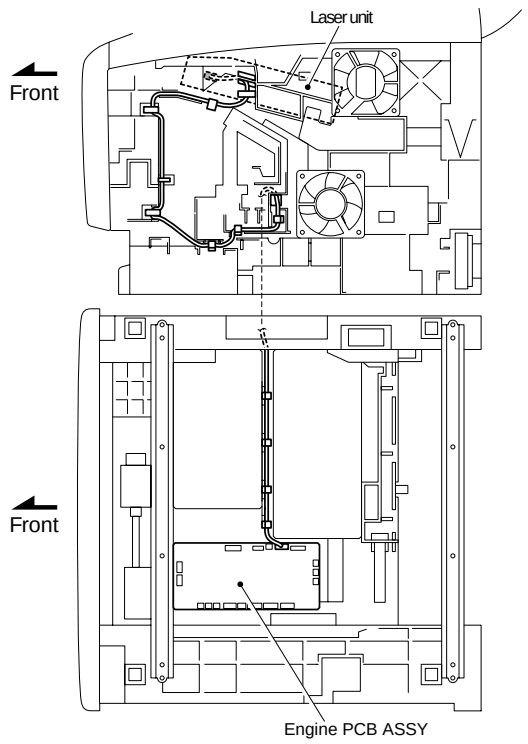
2 ・Fan motor 60 unit



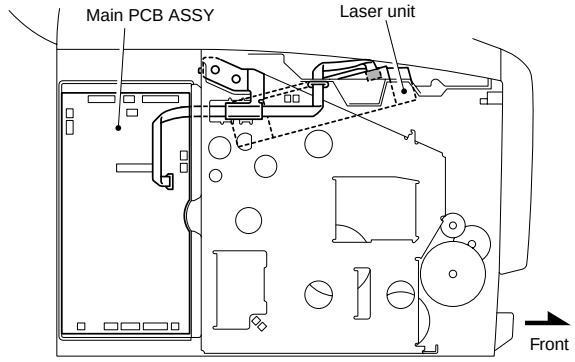
3 ・Fan motor 60 unit LV



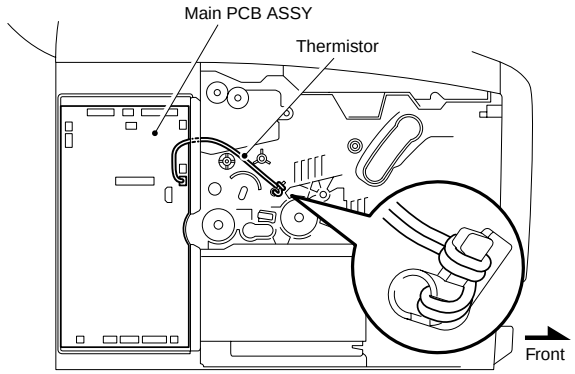
4 ・Laser unit (Polygon motor harness)



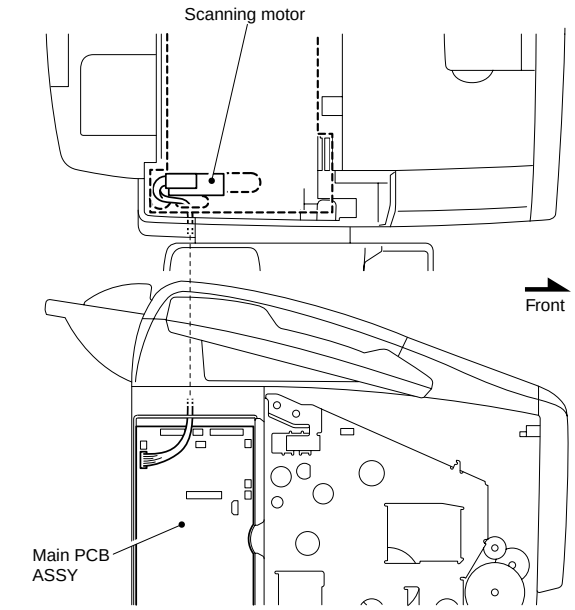
5 ・Laser unit (LD harness 5P)



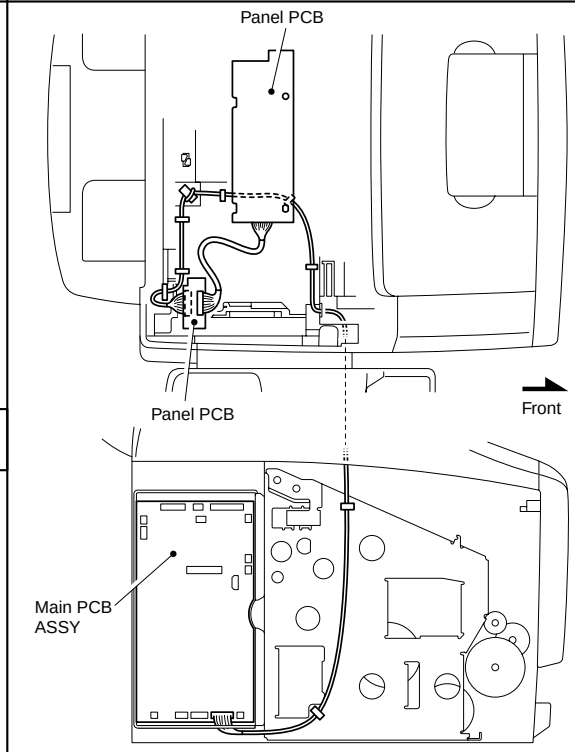
6 ・Thermistor



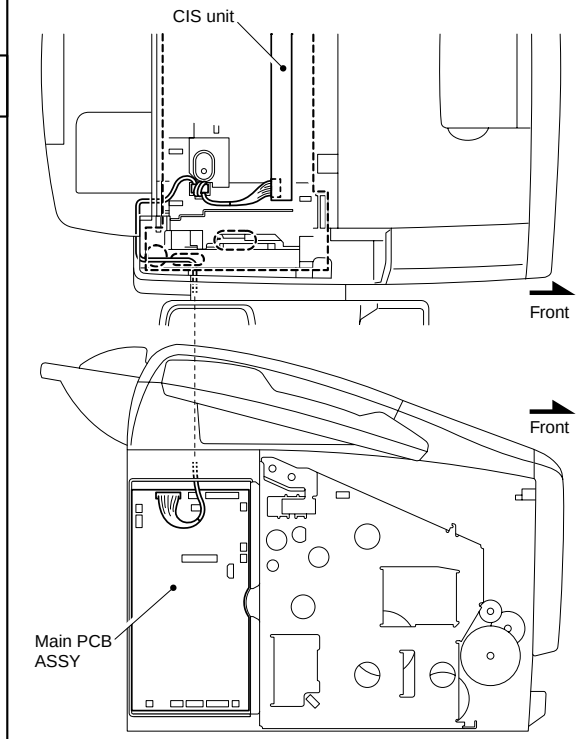
7 ・Scanning motor



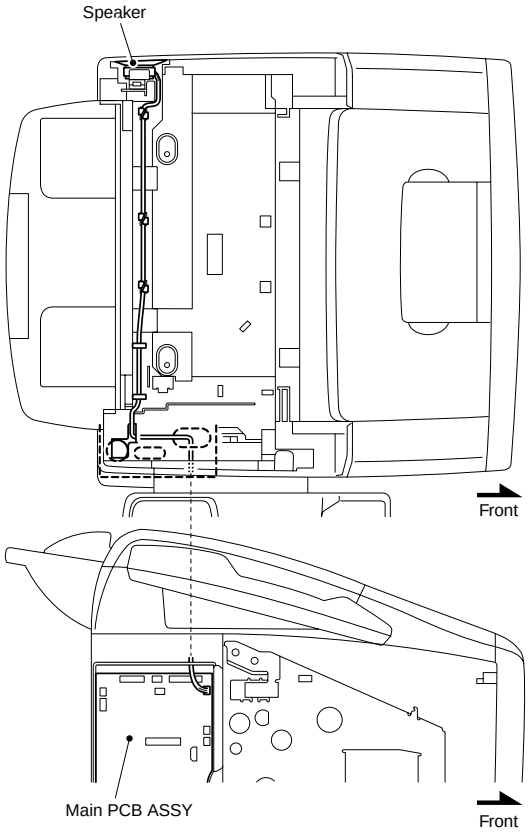
8 ・Panel PCB



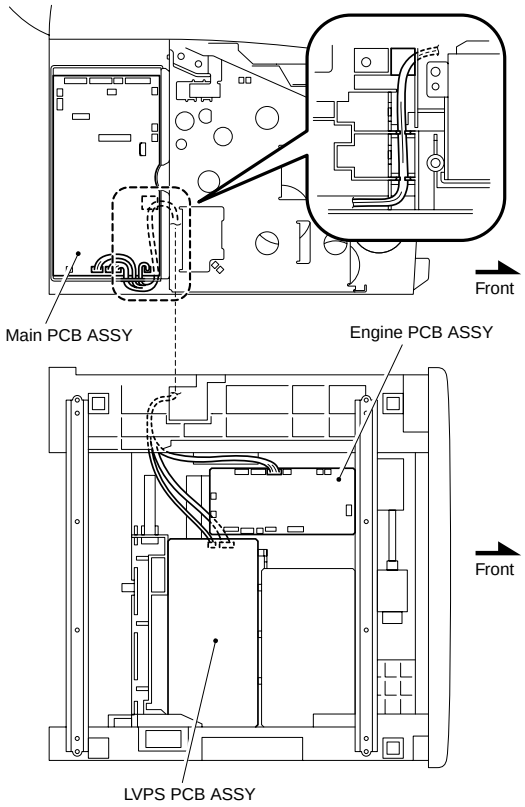
9 ・CIS unit



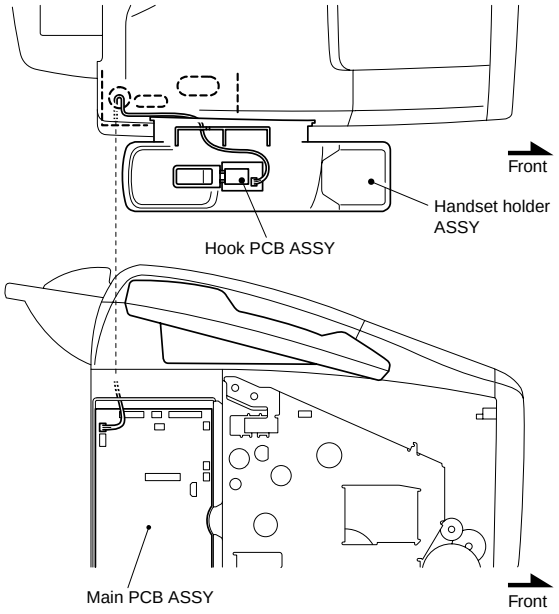
10 ・Speaker



12 ・Main PCB ASSY



11 ・Handset holder ASSY (Hook PCB ASSY)



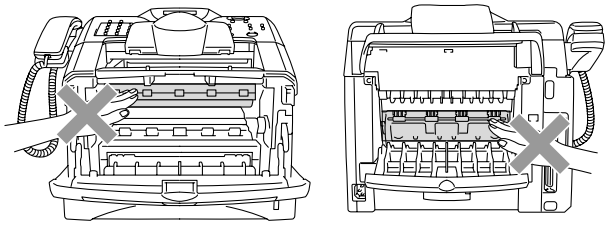
CHAPTER 5 PERIODIC MAINTENANCE

To avoid creating secondary problems by mishandling, follow the warnings below during maintenance work.

WARNING

(1) Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the machine.

(2) Some parts inside the machine are extremely hot immediately after the machine is used. When opening the front cover or rear cover to access any parts inside the machine, never touch the shaded parts shown in the following figures.



1. CONSUMABLE PARTS

The consumable parts described in this section are parts which are subject to deterioration or damage and should be replaced at least once during the period of warranty of the product if any print quality problem appears.

1.1 Drum Unit

Life expectancy: 20,000 pages
(When printing A4 size paper at 5% print coverage)

The life expectancy of the drum unit is approximately 20,000 pages (when printing A4 size paper at 5% print coverage).

The actual number of pages that your drum will print varies depending on an average print job type and type of paper to be used.

NOTE:

- *There are many factors that determine the actual drum life, such as temperature, humidity, type of paper, type of toner used, number of pages per print job and so on. Under ideal conditions, the average drum life is estimated at up to 20,000 pages. The actual number of pages that your drum will print may be significantly less than this estimate. Because we have no control over the many factors that determine the actual drum life, we cannot guarantee a minimum number of pages that will be printed by your drum.*
- *For best performance, use only genuine Brother toner. The machine should be used only in a clean, dust-free environment with adequate ventilation.*
- *Printing with a third-party drum unit may reduce not only the print quality but also the quality and life of the machine itself. Warranty coverage does not apply to problems caused by the use of third-party drum unit.*

<Change Drum message>

If the LCD shows the message below, it means the drum unit is near the end of its life. We recommend that you replace the drum unit with a new one before there is a noticeable deterioration in the print quality.

```
Change Drum Soon
```

Fig.5-1

> ***CAUTION:***
> *While removing the drum unit, handle it carefully because it may contain toner.*

<How to Check the Remaining Drum Life>

Press the **Menu, 2, 0,** and **3** keys in this order, and the drum life is displayed on the LCD for 2 seconds.

```
Drum Life
Remaining:xx%
```

Fig.5-2

<Replacement Procedure>

(1) Press the front cover release button and then open the front cover of the machine.

(2) Pull out the drum unit.

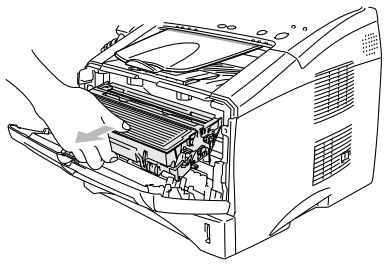
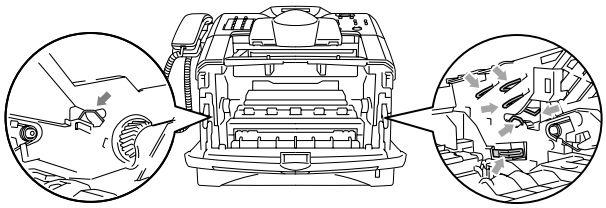


Fig. 5-3

> ***CAUTION:***
> - *We recommend that you place the drum unit on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.*
> - *To prevent damage to the machine from static electricity, do not touch the electrodes shown in the figure below.*



(3) While pressing the blue lock lever, take the toner cartridge out of the drum unit.

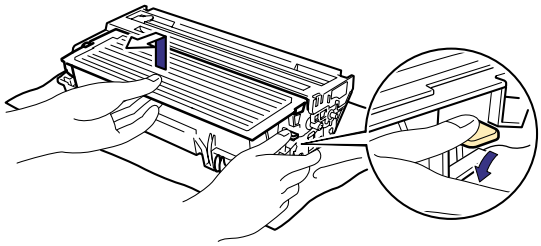


Fig. 5-4

(4) Unpack the new drum unit.

(5) Put the toner cartridge in the new drum unit until you hear it lock into place with a click. When the toner cartridge is installed correctly, the blue lock lever is lifted automatically. Make sure you fit the toner cartridge properly, or it may separate from the drum unit when you pick up the drum unit.

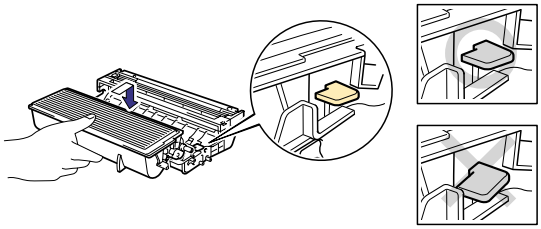


Fig. 5-5

(6) Put the drum unit in the machine.

(7) Press the **Clear/Back** button.

(8) Press the **1** key to reset the drum counter. When "Accepted" message is displayed on the LCD, close the front cover.

CAUTION:

- *Only unpack a drum unit immediately before you need to install it into the machine. If an unpacked drum unit is subjected to excessive direct sunlight or room light, the unit may be damaged.*
- *Handle the drum unit and toner cartridge carefully. If toner scatters on your hands or clothes, wipe or wash it off with cold water immediately.*
- *Discard the used drum unit according to local regulations, keeping it separate from domestic waste. If you have questions, call your local waste disposal office.*
- *Be sure to seal up the drum unit tightly so that toner powder does not spill out of the unit.*
- *Do not reset the drum counter when replacing the toner cartridge only.*
- *Do not turn off the drum lamp until the drum counter is reset.*
- *It is recommended to clean the machine when you replace the drum unit. Refer to subsection 3. 'PERIODICAL CLEANING' in this Chapter.*

1.2 Toner Cartridge

Life expectancy: 6,500 pages / high-yield toner cartridge
3,300 pages / standard cartridge
(When printing A4 size paper at 5% print coverage)

NOTE:

- *The life of a new toner cartridge varies according to a print coverage ratio and a print job. In the case of single-sided printing of typical business documents (at 5% print coverage) on A4 size paper, up to 3,300 pages (standard cartridge) or 6,500 pages (high-yield toner cartridge) can be printed.*
- *The amount of toner used varies according to what is printed on the page and the print density setting.*
- *The more that is printed, the more toner will be used.*
- *If you change the print density setting for lighter or darker printing, the amount of toner that is used will change.*
- *Wait to unpack the toner cartridge until immediately before you install it in the machine.*

<Toner Low message>

When the toner cartridge is running low, the LCD shows Toner Low.

```
Toner Low
```

Fig.5-6

If the LCD shows this message, the toner cartridge has nearly run out of toner. Buy a new toner cartridge and have it ready before you get a Toner Empty message.

<Toner Empty message>

```
Toner Empty
```

Fig.5-7

<Replacement Procedure>

(1) Press the front cover release button and then open the front cover.

(2) Pull out the drum unit.

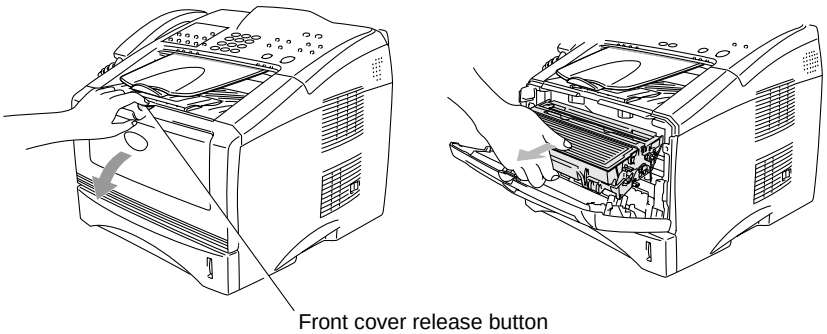
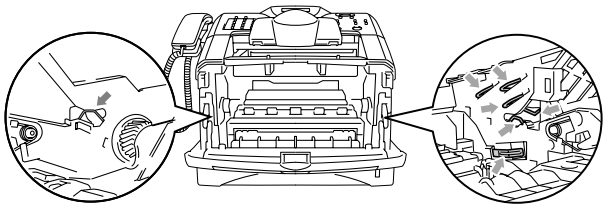


Fig.5-8

CAUTION:

- *It is recommended to place the drum unit assembly on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.*
- *To prevent damage to the machine from static electricity, do not touch the electrodes shown in the figure below.*



(3) Push down the blue lock lever and take the toner cartridge out of the drum unit.

(4) Unpack the new toner cartridge. Hold the cartridge level with both hands and gently rock it from side to side five or six times to spread the toner evenly inside the cartridge.

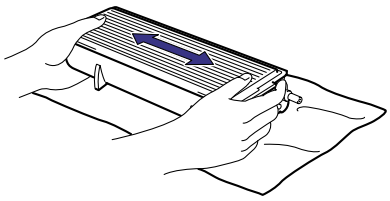


Fig. 5-9

(5) Remove the protective cover.

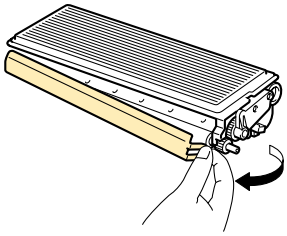


Fig. 5-10

(6) Put the new toner cartridge firmly into the drum unit until you hear it lock into place. If you put it in properly, the lock lever will lift automatically. Make sure you fit the toner cartridge properly or it may separate from the drum unit.

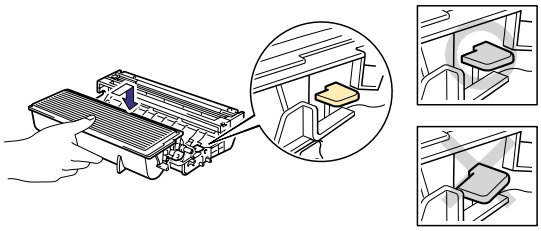


Fig. 5-11

(7) Clean the primary corona wire inside the drum unit by gently sliding the blue tab from right to left several times. Return the tab to the home position before you put the drum unit back in the machine. If you do not, printed pages may have a vertical stripe.

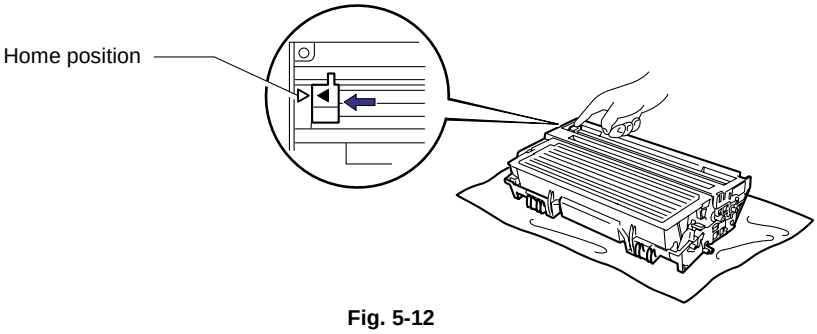
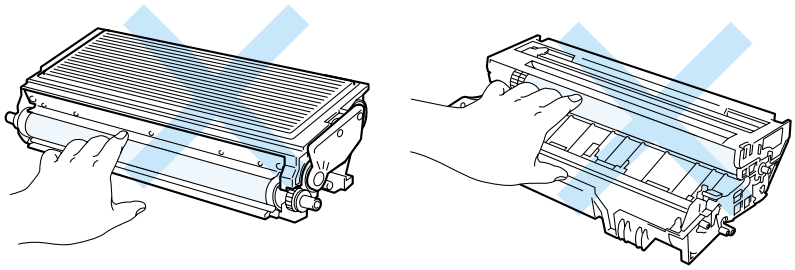


Fig. 5-12

(8) Put the drum unit back in the machine. Close the front cover of the machine.

CAUTION:

- *Handle the drum unit and toner cartridge carefully. If toner scatters on your hands or clothes, wipe or wash it off with cold water immediately.*
- *Be sure to seal the toner cartridge tightly so that toner powder does not spill out of the cartridge.*
- *Dispose of the used toner cartridge in accordance with local plastic waste regulations.*
- *Only unpack a toner cartridge immediately before you need to install it into the machine. If a toner cartridge is left unpacked for a long period of time, the toner life is shortened*
- *If an unpacked drum unit is subjected to excessive direct sunlight or room light, the unit may be damaged.*
- *Use a Brother genuine toner cartridge which is specially formulated to ensure top print quality.*
- *Printing with a 3rd party toner or toner cartridge may reduce not only the printing quality but also the quality and life of the machine itself. It may also cause serious damage to the performance and life of a genuine Brother drum unit. Warranty cover is not applied to problems caused by the use of 3rd party toner or toner cartridges.*
- *Brother strongly recommends that you do not refill the toner cartridge provided with the machine. We also strongly recommend that you continue to use only Genuine Brother Brand replacement toner cartridges. Using or attempting to use potentially incompatible toner and/or toner cartridges in the machine may cause damage to the machine itself and/or it may result in unsatisfactory print quality.*
- *Make sure that the wire cleaner on the drum unit is returned to the home position (▲ mark position) before re-installing the drum unit into the machine, or printed pages may have vertical stripes. (Refer to Fig. 5-12.)*
- *Install the toner cartridge immediately after you remove the protective cover. Do not touch the development roller and photosensitive drum shaded as shown below;*



NOTE:

It is recommended to clean the machine when you replace the toner cartridge. Refer to subsection 3. 'PERIODICAL CLEANING' in this Chapter.

2. PERIODICAL REPLACEMENT PARTS

Periodical replacement parts are the parts to be replaced periodically to maintain product quality. These parts would affect the product quality greatly if they lost their function even if they do not appear to be damaged or there is no change in their appearance.)

The periodical replacement parts listed below should be replaced at the service center referring to the service life. For the procedures to replace these parts, refer to CHAPTER 4 "DISASSEMBLY AND RE-ASSEMBLY".

Parts Name	Part No.	Qty	Service life (number of prints)	Replacement Procedure
Fixing Unit (115V)	LM2579001	1	80,000 pages	See subsection 3.14 in CHAPTER 4.
Fixing Unit (220V)	LM2578001	1	80,000 pages	See subsection 3.14 in CHAPTER 4.
Paper Feeding Kit (Pad holder / Paper pick-up roller ASSY)	LJ7920001	1	50,000 pages	See subsection 3.3 and 3.21 in CHAPTER 4.

NOTE:

- *The above table shows only estimated values. They are subject to change without prior notice.*
- *The actual number of printed pages may vary depending on your average type of print job and paper. These figures are based on 5% coverage per page.*
- *The part numbers listed above are as of February 2004. They are subject to change without notice.*

2.1 Fixing Unit

<Disassembly Procedure>

1) Disconnect the power cord from the machine.

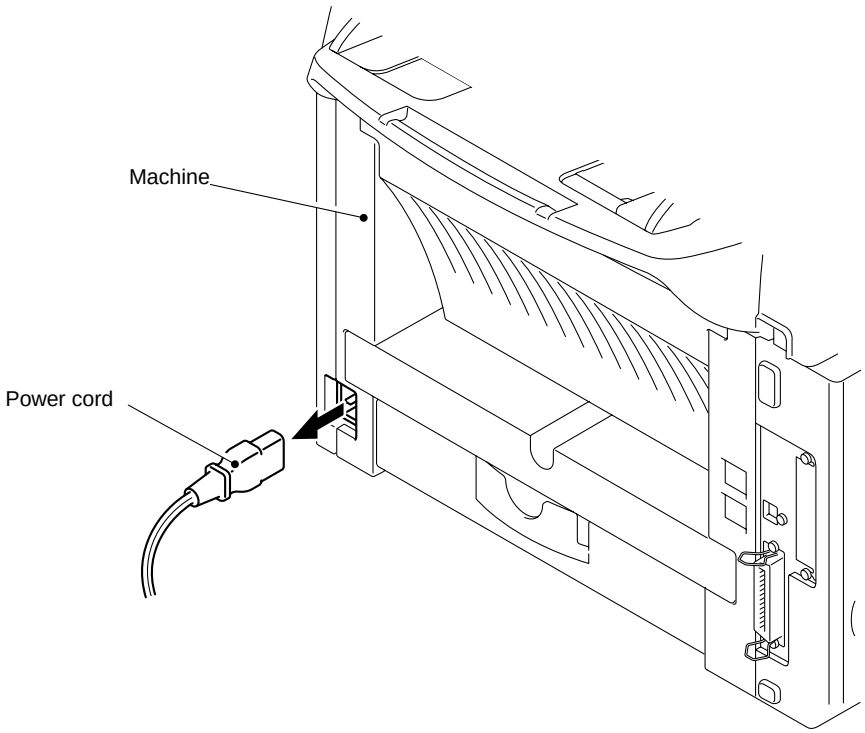


Fig.5-13

2) Close the front cover ASSY and pull out the paper tray.

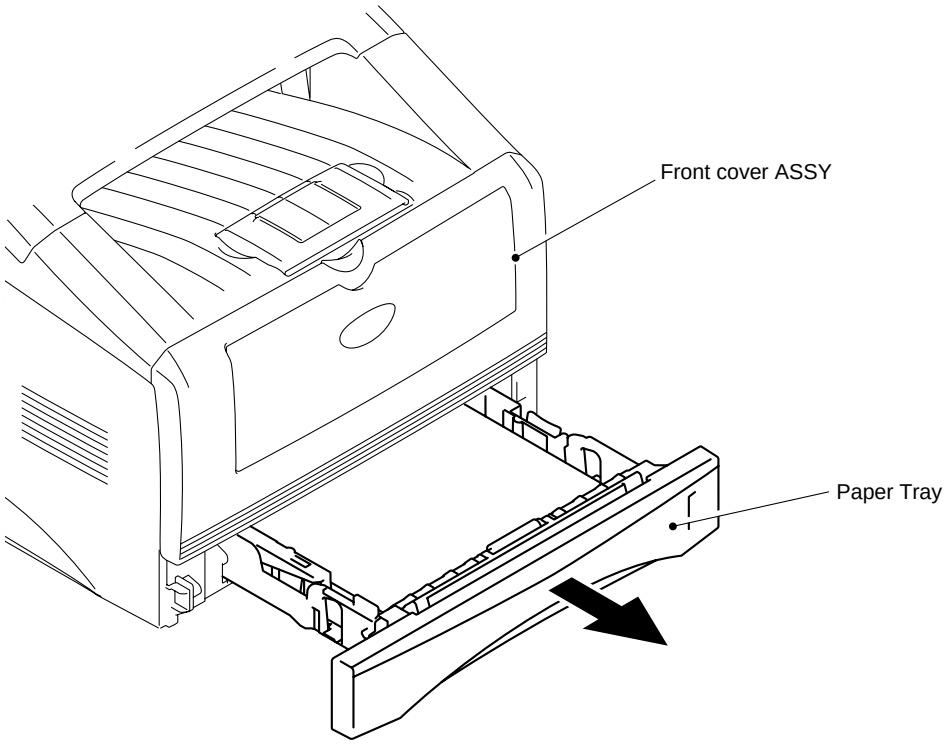


Fig.5-14

3) Remove the bind B M4x12 Taptite screw, and then remove the rear cover C.

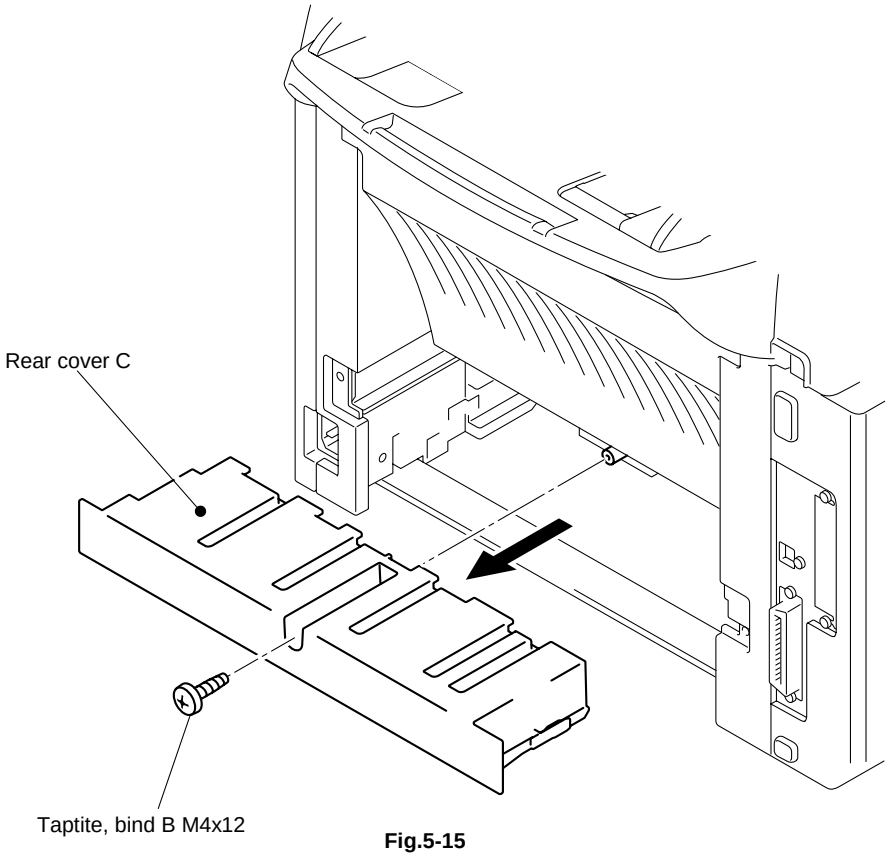


Fig.5-15

4) Remove the outer chute.

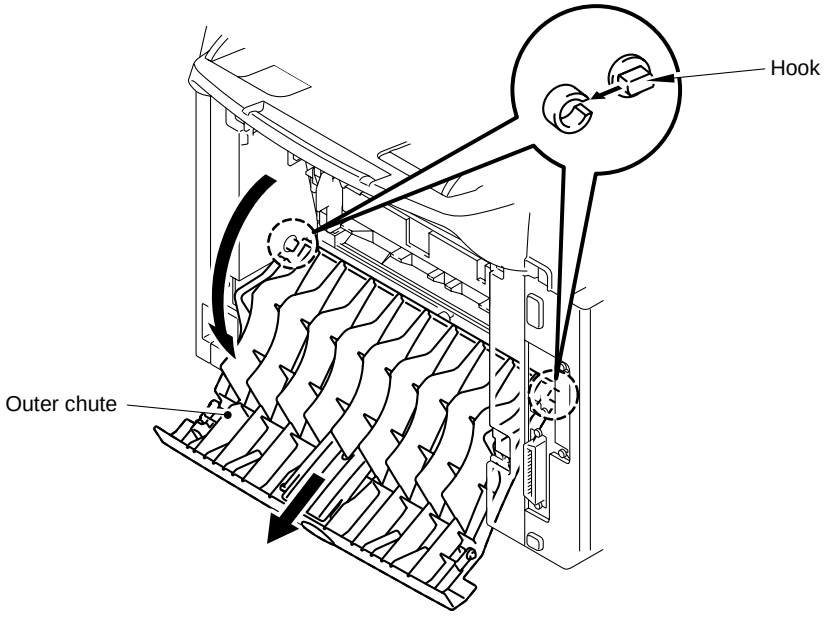


Fig.5-16

5) Remove the two bind B M4x12 Taptite screws, and then remove the rear cover L.

6) Remove the two bind B M4x12 Taptite screws, and then remove the rear cover R.

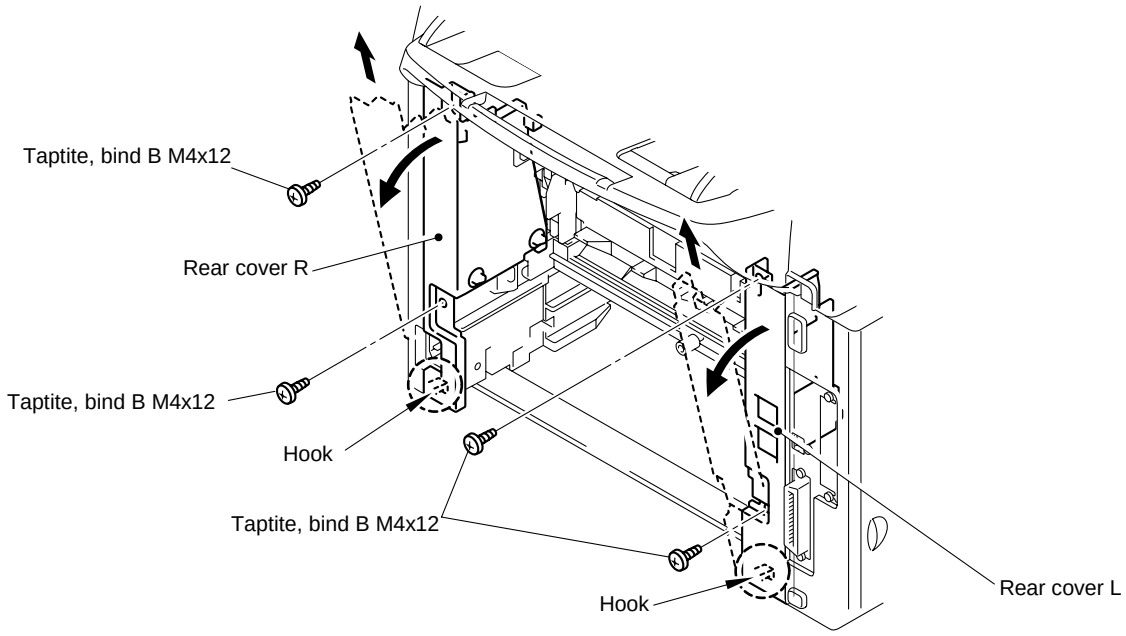


Fig.5-17

7) Remove the two cup S M3x6 Taptite screws, and then remove the NCU unit.

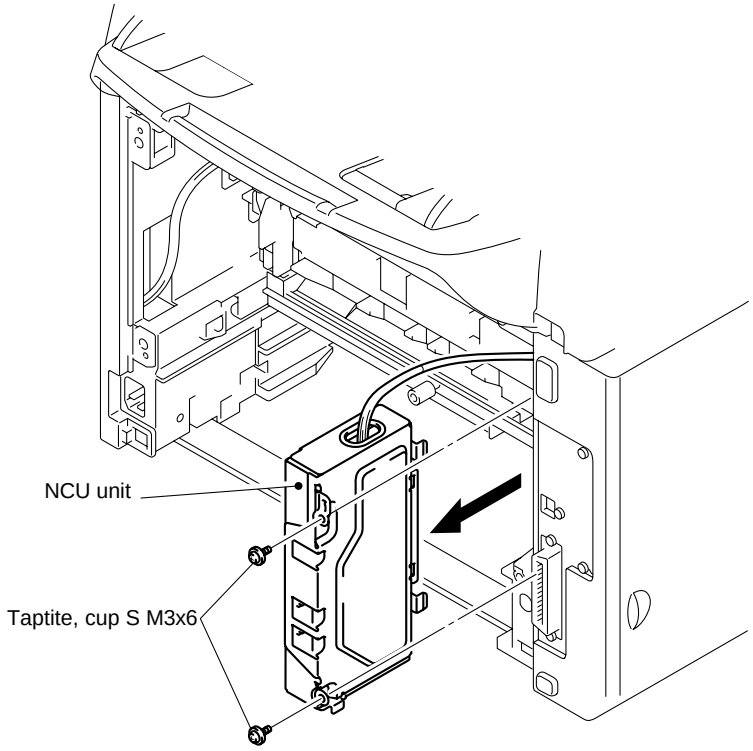


Fig.5-18

8) Disconnect the heater harness and thermistor harness.

9) Remove the bind B M4x12 Taptite screw and the shoulder screw, and then remove the fixing unit.

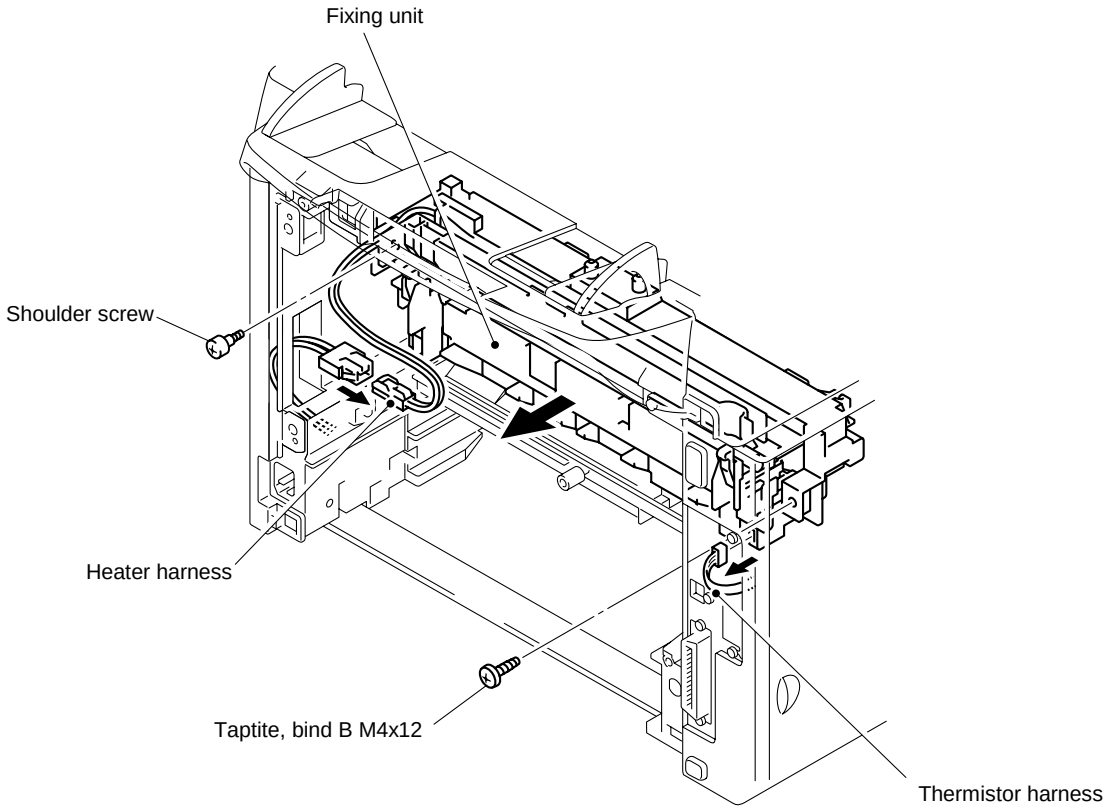


Fig.5-19

<Assembly Procedure>

(1) Mount the fixing unit using the bind B M4x12 Taptite screw and the shoulder screw.

(2) Insert the heater harness and the thermistor harness.

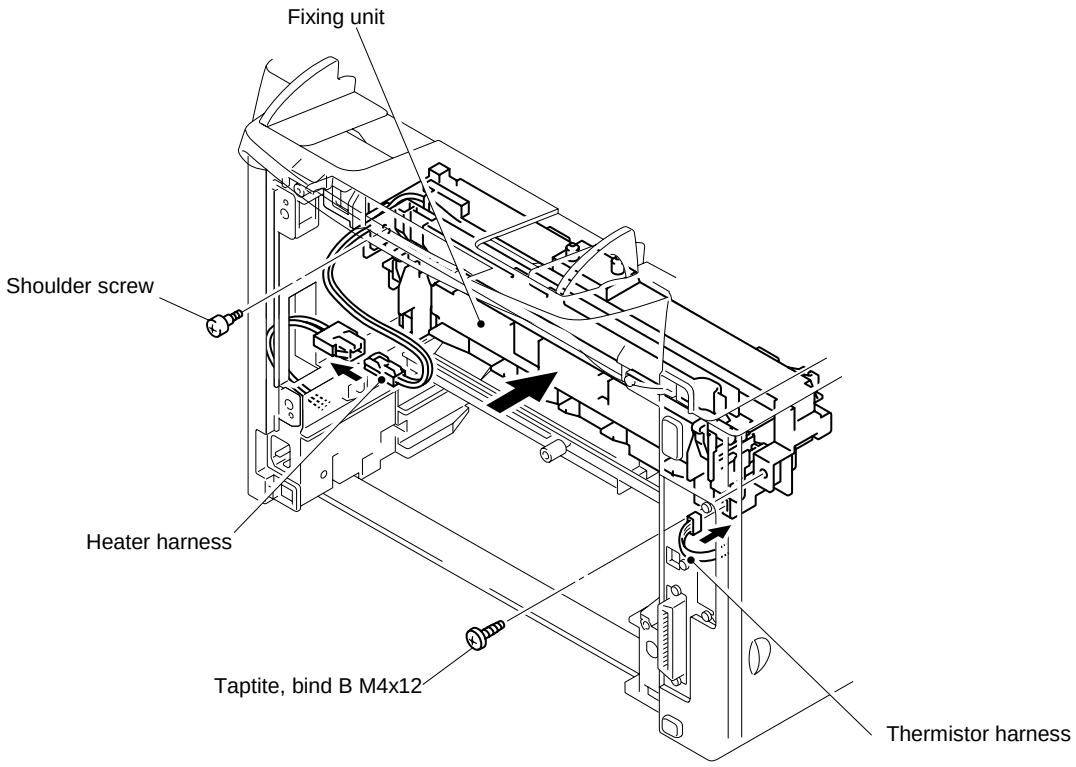


Fig.5-20

(3) Mount the NCU unit using the two cup S M3x6 Taptite screws.

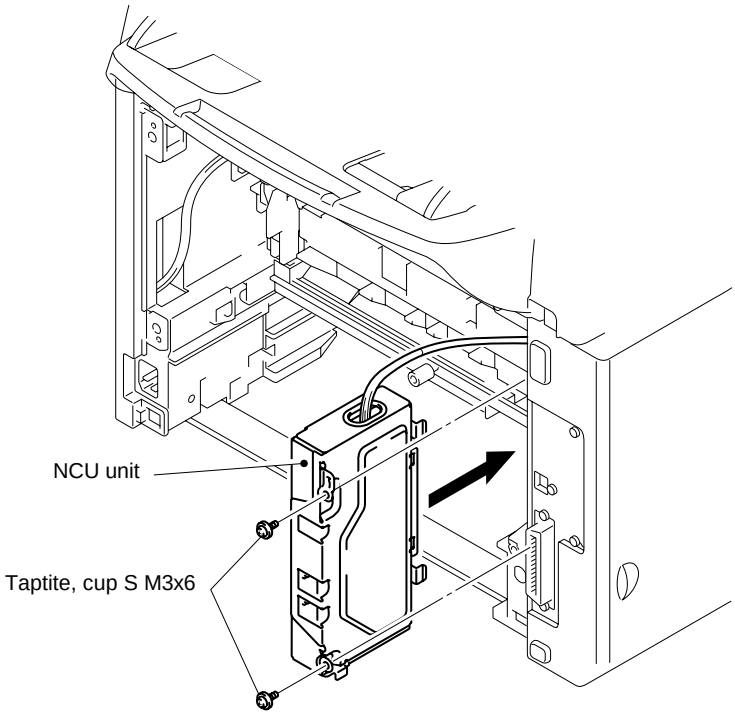


Fig.5-21

(4) Mount the rear cover L using the two bind B M4x12 Taptite screws.

(5) Mount the rear cover R using the two bind B M4x12 Taptite screws.

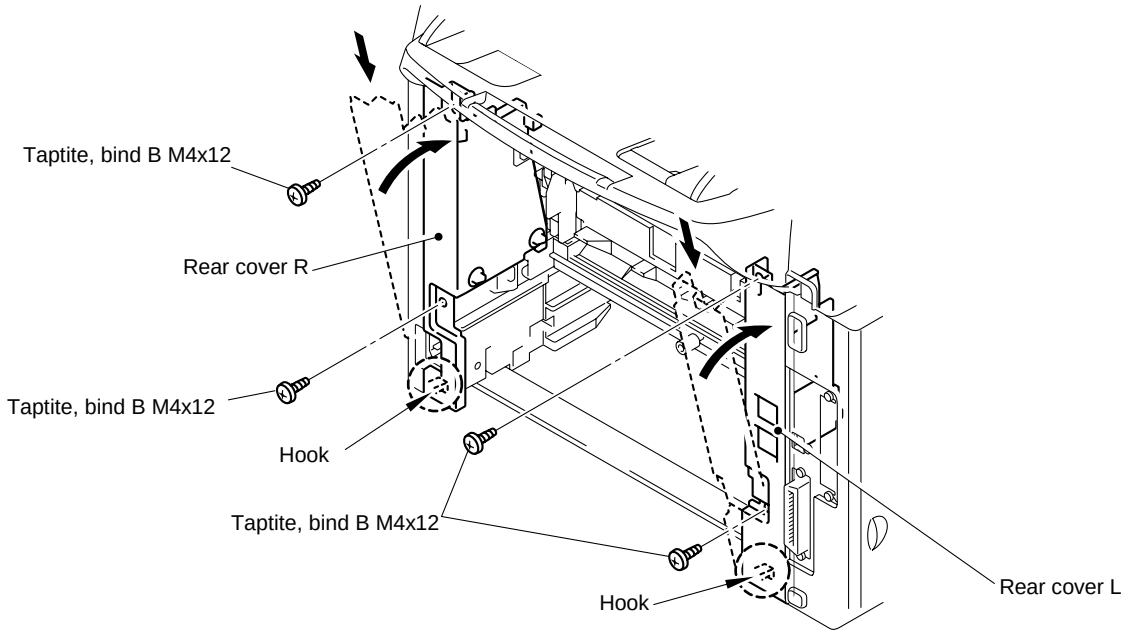


Fig.5-22

(6) Mount the outer chute.

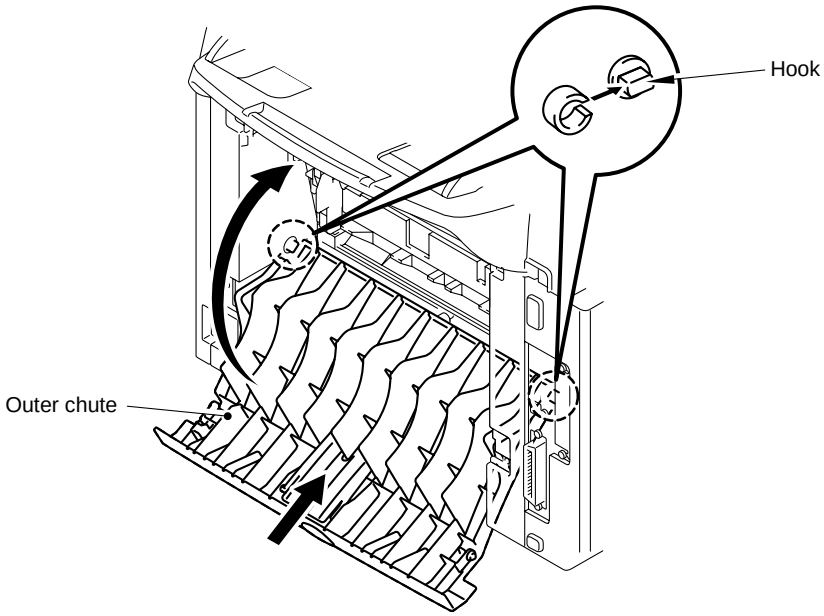


Fig.5-23

(7) Mount the rear cover C using the bind B M4x12 Taptite screw.

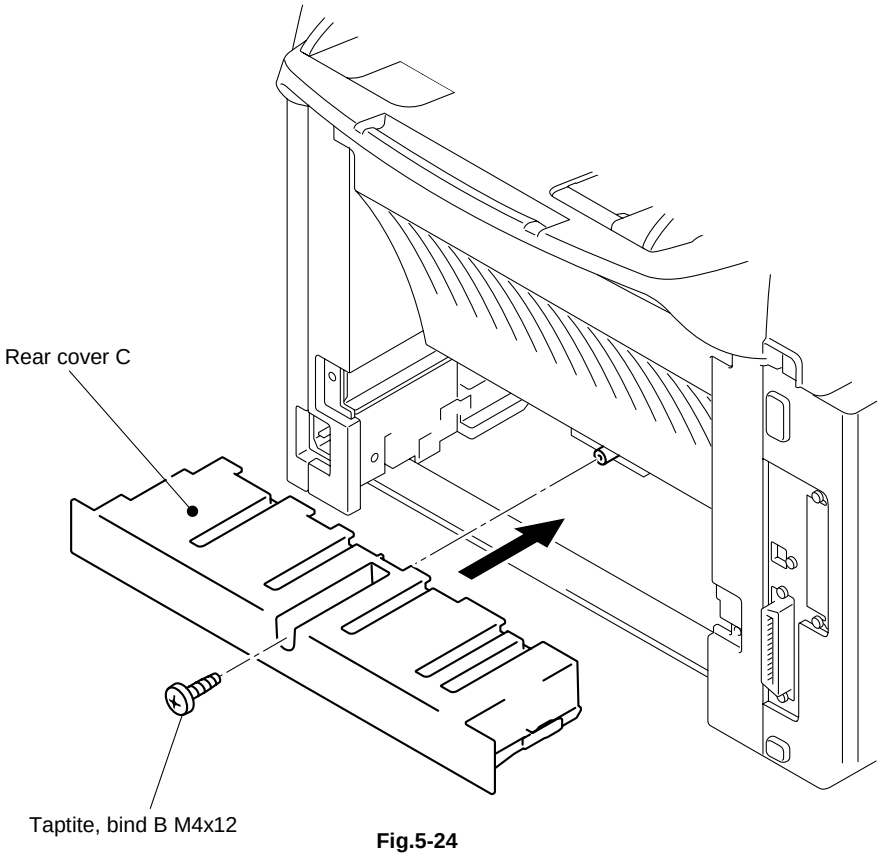


Fig.5-24

(8) Insert the paper tray.

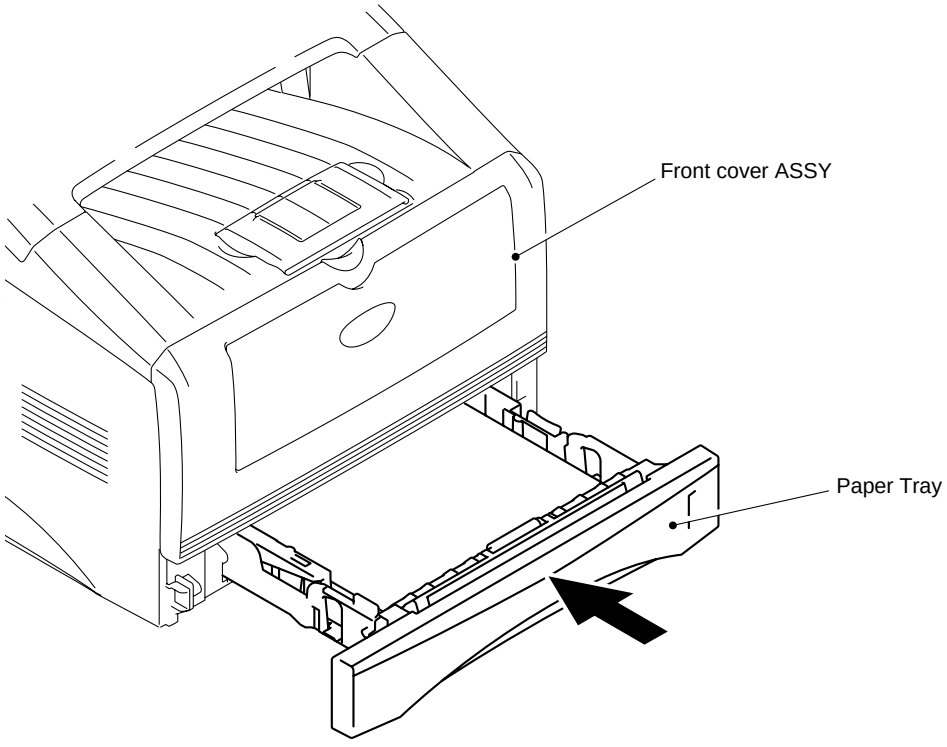


Fig.5-25

(9) Insert the power cord to the machine.

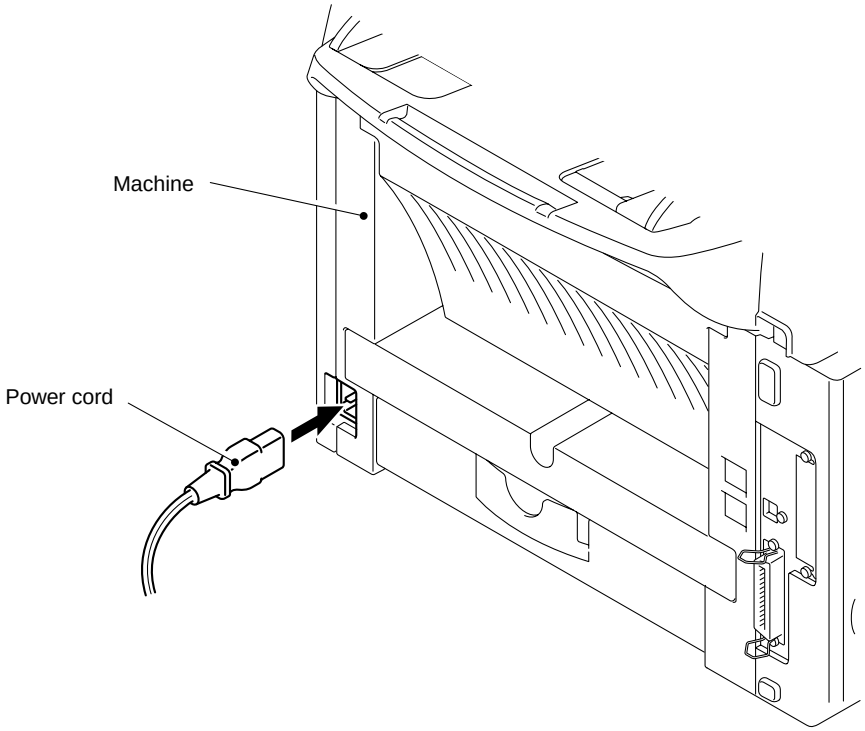


Fig.5-26

2.2 Paper Feeding Kit

<Disassembly Procedure>

1) Disconnect the power cord from the machine.

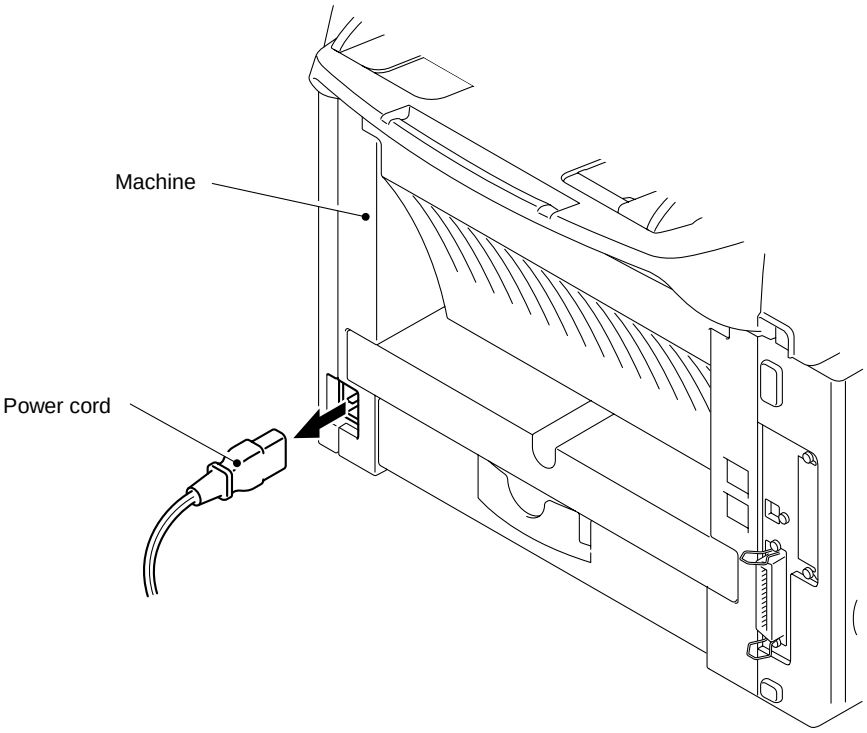


Fig.5-27

2) Close the front cover ASSY and pull out the paper tray.

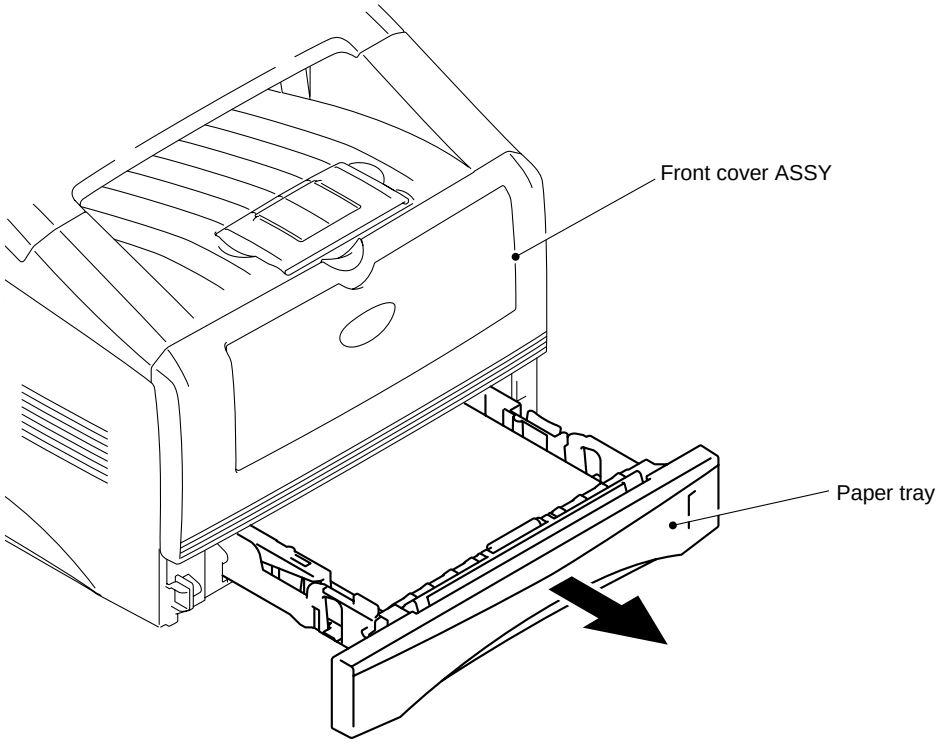


Fig.5-28

3) Remove the pad holder and the separation pad spring from the paper tray.

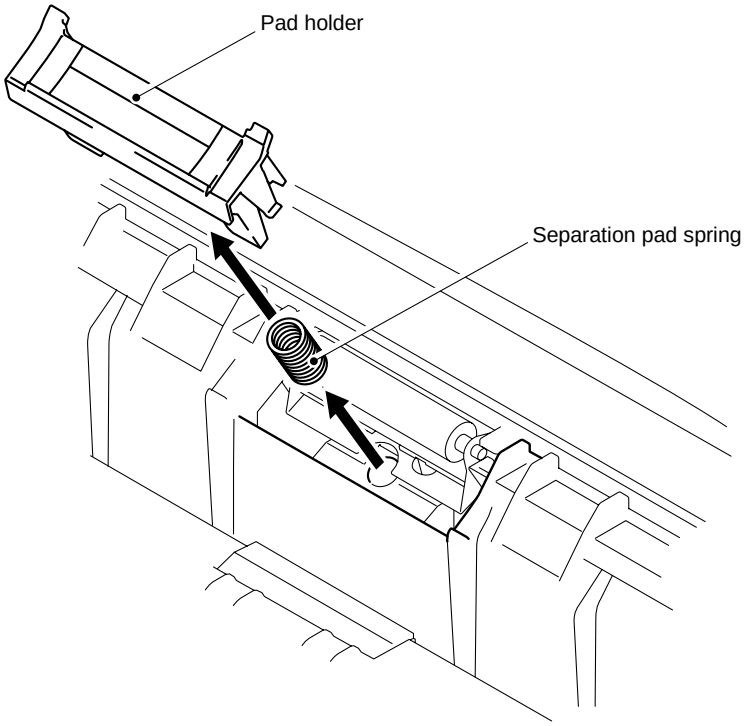


Fig.5-29

4) Turn the machine over.
5) Remove the bush R.
6) Remove the paper pick-up roller ASSY.
7) Remove the two roller collars from the paper pick-up roller ASSY.

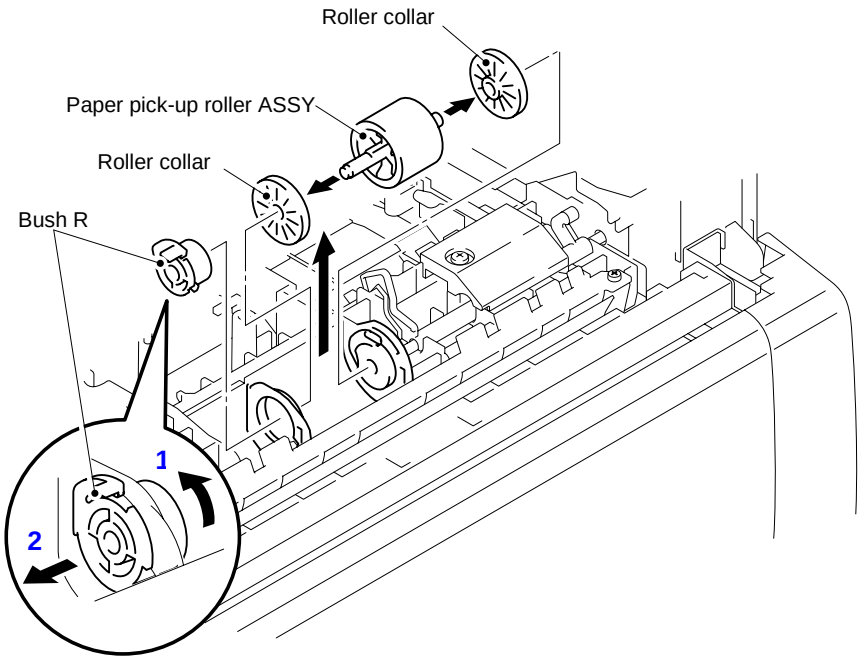


Fig.5-30

<Assembly Procedure>

(1) Mount the two roller collars to the paper pick-up ASSY.

(2) Mount the paper pick-up roller ASSY.

(3) Mount the bush R.

(4) Turn the machine back to the original orientation.

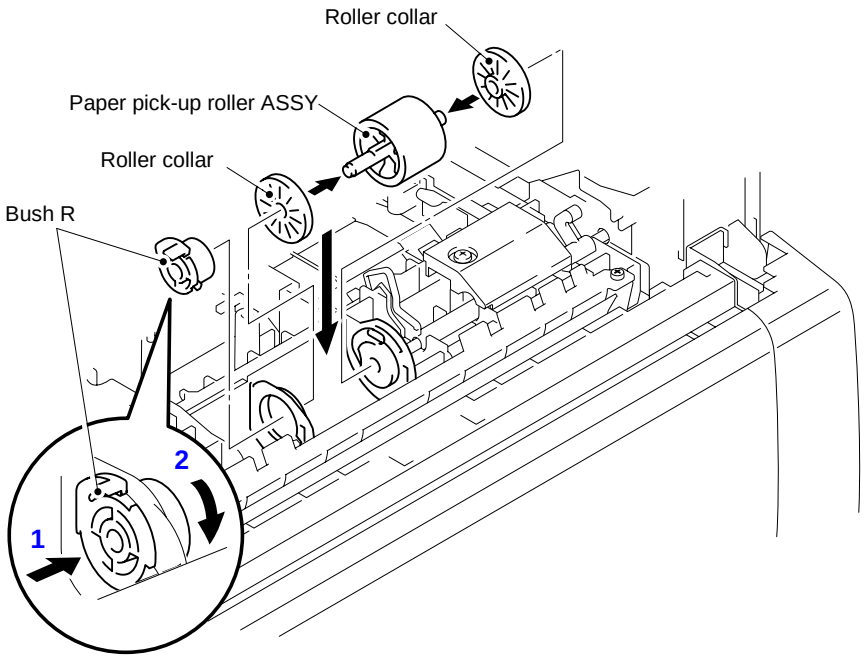


Fig.5-31

(5) Mount the pad holder and the separation pad spring to the paper tray.

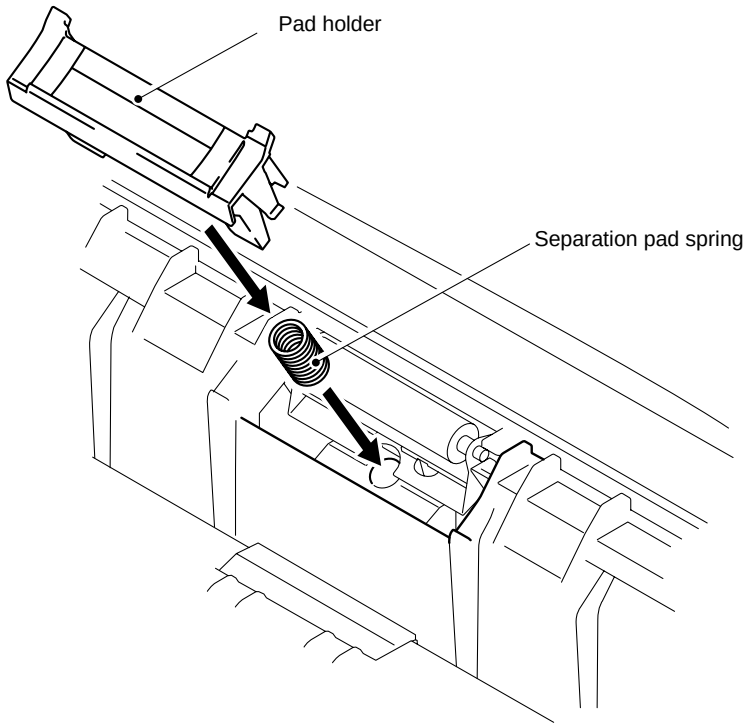


Fig.5-32

(6) Insert the paper tray.

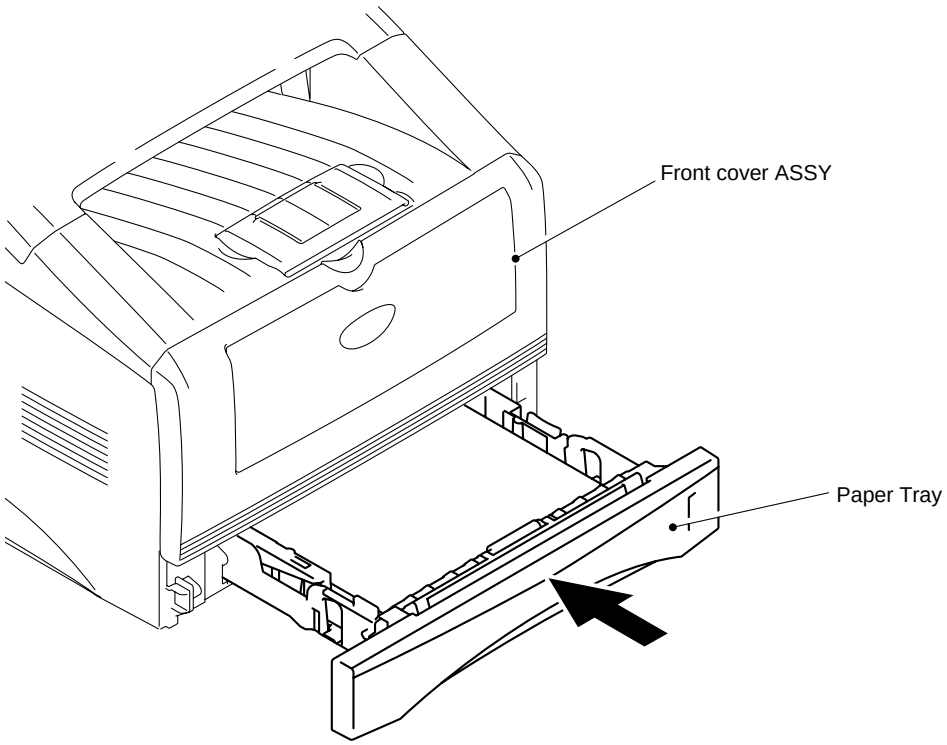


Fig.5-33

(7) Insert the power cord to the machine.

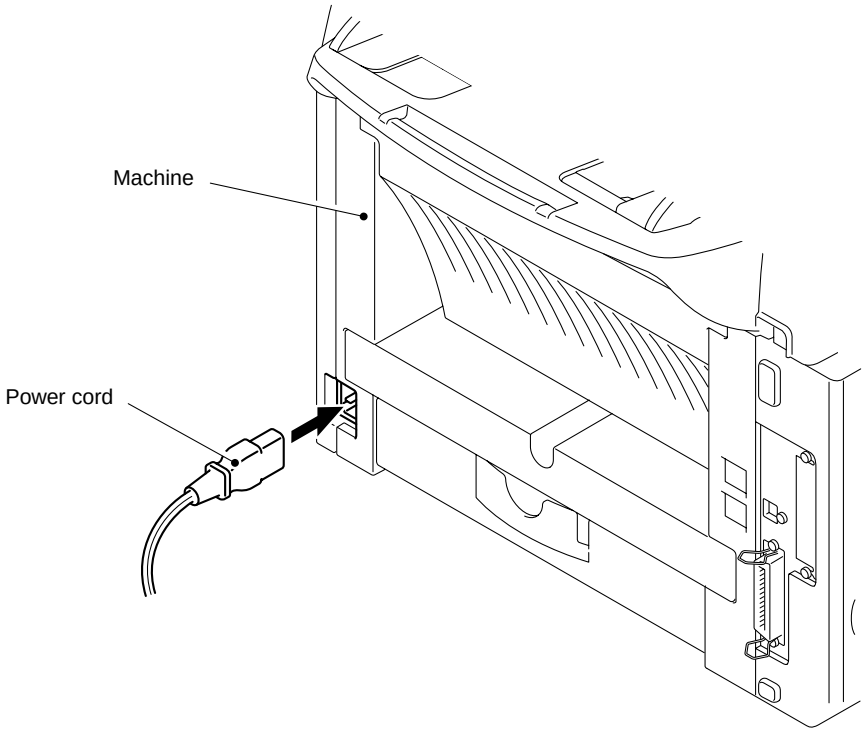


Fig.5-34

3. PERIODICAL CLEANING

Clean the following parts periodically to avoid any machine problems or print image defects.

> ***CAUTION:***
> *While drum unit and scanner window cleaning basically can be implemented by the end user, the electrical terminals inside the machine and on the drum unit should be cleaned by a service technician. Instruct the users not to touch those terminals.*

> ***WARNING***
> ***There are high voltage electrodes inside the machine. Before cleaning the machine, make sure that the power switch has been turned off and the power cord has been unplugged from the power outlet.***

3.1 Cleaning the Machine Exterior

Clean the machine exterior to keep the machine clean.

1) Turn off the power switch and unplug the power cord.
2) Wipe dirt and dust away from the machine exterior with a damp cloth and allow the machine to dry completely before turning the power on again.
3) Plug in the power cord.

> ***CAUTION:***
> - *Use water or neutral detergents for cleaning. Cleaning with volatile liquids such as thinner or benzene will damage the surface of the machine.*
> - *Do not use cleaning materials that contain ammonia. They will damage the machine and the toner cartridge.*

3.2 Cleaning the Scanner

Open the control panel cover. Clean the white bar (document holder) and the lower glass cover with a lint-free cloth with office equipment cleaning solution.

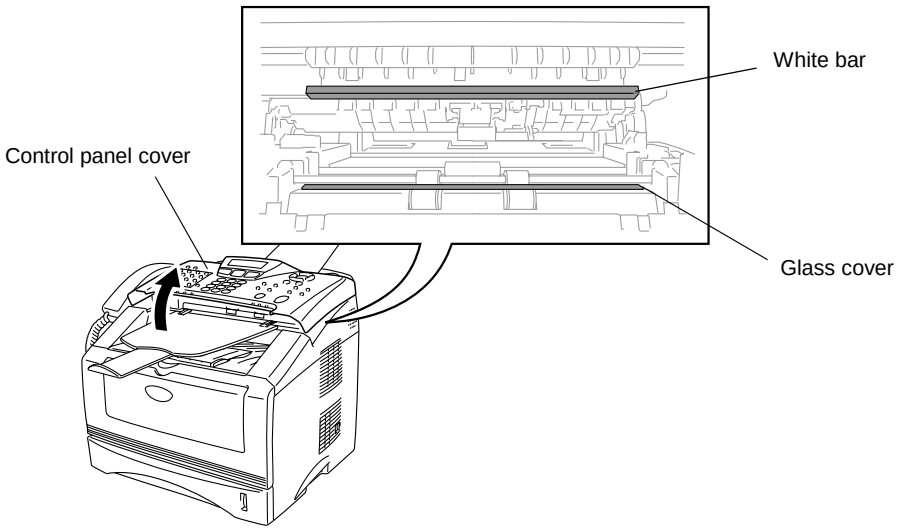


Fig.5-35

3.3 Cleaning the Drum Unit

When replacing the drum unit or toner cartridge with a new one, be sure to clean the drum unit.

1) Turn off the power switch and unplug the power cord.
2) Press the front cover release button, and then open the front cover.
3) Pull out the drum unit.

> ***CAUTION:***
> *It is recommended to place the drum unit on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.*

4) Clean the primary corona wire inside the drum unit by gently sliding the blue tab from right to left several times. Return the tab to the home position before re-install the drum unit.

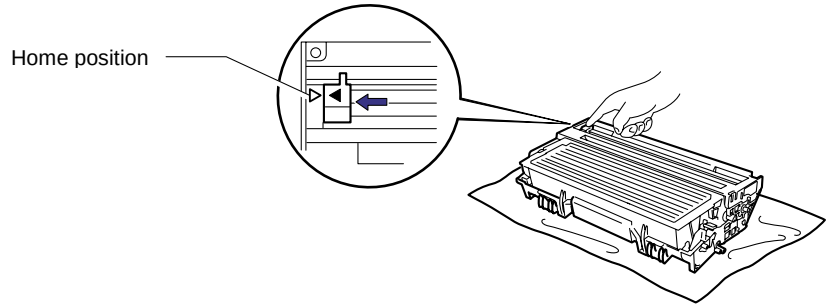


Fig.5-36

> ***CAUTION:***
> *Make sure that the blue tab on the drum unit is returned to the home position (▲ mark position) before re-installing the drum unit into the machine, or printed pages may have vertical stripes.*

5) Re-install the drum unit into the machine.
6) Close the front cover.

3.4 Cleaning the Scanner Window

When replacing the drum unit or toner cartridge with a new one, be sure to clean the scanner window.

1) Turn off the power switch and unplug the power cord.
2) Press the front cover release button, and then open the front cover.
3) Pull the drum unit out of the machine.

> ***CAUTION:***
> *It is recommended to place the drum unit on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.*

4) Gently wipe the scanner window with a soft dry cloth.

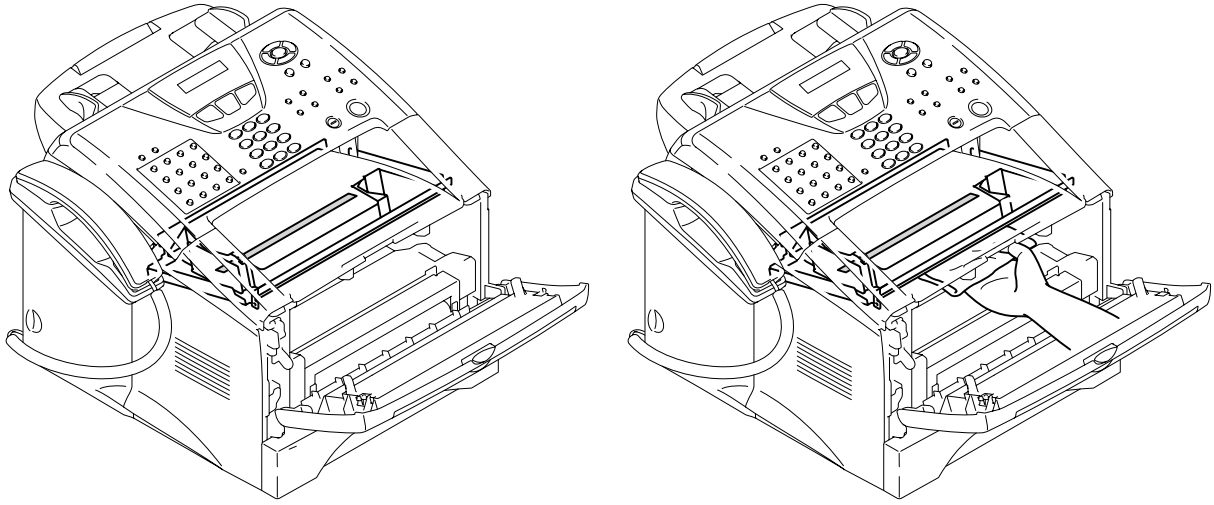


Fig. 5-37

5) Re-install the drum unit into the machine. Close the front cover.

6) Plug in the power cord, and then turn on the power switch.

> ***CAUTION:***
> - *Handle the drum unit carefully since it contains toner. If toner scatters and your hands or cloths get dirty, immediately wipe or wash it off with cold water.*
> - *Do not touch the scanner window with your fingers.*
> - *Do not wipe the scanner window with isopropyl alcohol.*

3.5 Cleaning the Electrical Terminals

To obtain the best print performance, be sure to clean the electrical terminals inside the machine.

1) Turn off the power switch and unplug the power cord.

2) Remove the drum unit from the machine.

3) Wipe the electrical terminals as shown in the figure below with a soft dry cloth.

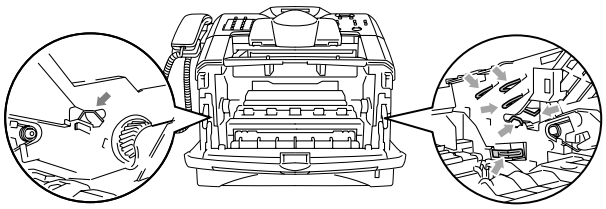


Fig. 5-38

4. MTBF / MTTR

The meantime between failure (MTBF) and the meantime to repair (MTTR) for this machine are as follows;

MTBF: Up to 4,000 hours

MTTR: Average 30 minutes except the periodical maintenance parts (the Paper Feeding Kit) and the machine control boards whose MTTR is average 10 minutes.

CHAPTER 6 TROUBLESHOOTING

1. INTRODUCTION

1.1 Initial Check

(1) Operating environment

Check if:

- The source voltage stays within ±10% from the rated voltage shown on the rating plate.
- The machine is installed on a solid, level surface.
- The room temperature is maintained between 10°C and 32.5°C. The relative humidity is maintained between 20% and 80%.
- The machine is not located in a dusty place.
- The machine is not exposed to ammonia fumes or other harmful gases.
- The machine is not located in a hot or humid area (such as near water or a humidifier).
- The machine is not exposed to direct sunlight.
- The room is well-ventilated.
- The machine is not placed where the ventilation hole of the machine is blocked.

(2) Print paper

Check if :

- A recommended type of print paper is being used. [If the paper is too thick or too thin, or tends to curl, paper jams or paper feed problems may occur, or printed images may be blurred.]
- The print paper is damp. [If so, use fresh paper, and check whether the print quality improves or not.]
- The print paper is short-grained paper or acid paper. [If so, print quality problems may occur.]

For further information on paper, refer to subsection 2.3 ‘Paper’ in CHAPTER 1.

(3) Consumable parts

Check if:

- The LCDs on the machine control panel indicate “Toner Empty”. If the LCDs indicate “Toner Empty”, replace the cartridge with a new one.

For further information on consumable parts, refer to 1. ‘CONSUMABLE PARTS’ in CHAPTER 5.

(4) Others

Condensation:

When the machine is moved from a cold room into a warm room in cold weather, condensation may occur inside the machine, causing various problems as listed below:

- Condensation on the optical surfaces such as the scanning mirror, lenses, the reflection mirror and the protection glass may cause the print image to be light.
- If the photosensitive drum is cold, the electrical resistance of the photosensitive layer is increased, making it impossible to obtain the correct contrast when printing.
- Condensation on the corona unit may cause corona charge leakage.
- Condensation on the hopper plate and separation pad may cause paper feed troubles.

If condensation has occurred, print several pages or leave the machine for 2 hours to allow it to reach room temperature.

If the drum unit is unpacked soon after it is moved from a cold room to a warm room, condensation may occur inside the unit, which may cause incorrect images. Instruct the user to allow the unit to come to room temperature before unpacking it. This will take one or two hours.

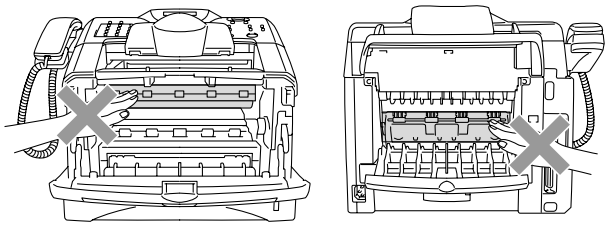
1.2 Warnings for Maintenance Work

To avoid creating secondary problems by mishandling, follow the warnings below during maintenance work.

WARNING

(1) Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the machine.

(2) Some parts inside the machine are extremely hot immediately after the machine is used. When opening the front cover or rear cover to access any parts inside the machine, never touch the shaded parts shown in the following figures.

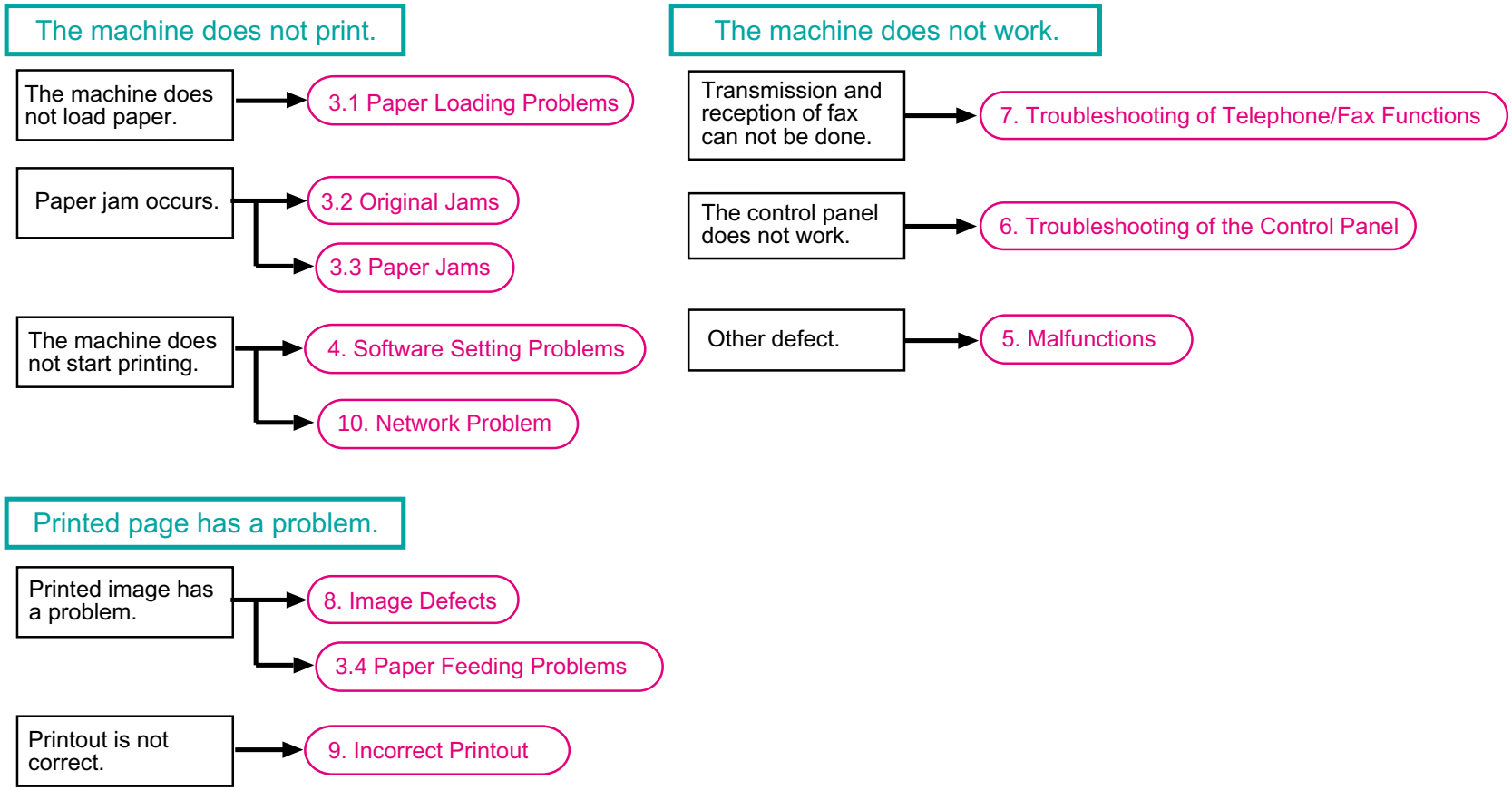


1.3 Identify the Problem

If you encounter any machine error or problem, first identify it referring to the chart below, then see the appropriate section.

NOTE:

The following troubleshooting sections contain both the actions which users should take or check and the ones which service technicians should perform.


The machine does not print.
The machine does not load paper.
3.1 Paper Loading Problems
Paper jam occurs.
3.2 Original Jams
3.3 Paper Jams
The machine does not start printing.
4. Software Setting Problems
10. Network Problem
The machine does not work.
Transmission and reception of fax can not be done.
7. Troubleshooting of Telephone/Fax Functions
The control panel does not work.
6. Troubleshooting of the Control Panel
Other defect.
5. Malfunctions
Printed page has a problem.
Printed image has a problem.
8. Image Defects
3.4 Paper Feeding Problems
Printout is not correct.
9. Incorrect Printout

2. ERROR MESSAGE

2.1 Error Message on the LCD

If a machine error occurs, the machine emits an audible alarm (continuous beeping) for approximately 4 seconds and shows the error message on the LCD. For the error message, see below.

Error Message	Cause	Action
Change Drum Soon	The drum unit is near the end of its life.	Use the drum unit until you have a print quality problem; then replace the drum unit with a new one.
	The drum counter was not reset.	1. Open the front cover, and then press **Clear/Back** button. 2. Press **1** key to reset.
Check Original	The originals were not inserted or fed properly, or original scanned from ADF was longer than about 36 inches (90cm).	See Original jams on page 6-11.
Check Paper Check Paper #1 Check Paper #2	The machine is out of paper or paper is not properly loaded in the paper tray.	Refill the paper in the paper tray or MP tray. - OR - Remove the paper and load it again.
Check Paper MF	Paper in the manual feed tray runs out.	Reload paper.
Check Paper Size	When you see this error, the paper in the paper tray does not match the paper size you set in **Menu** button, **1** key, **and 3** key.	Either load the appropriate size paper or change the default setting.
Comm. Error	Poor phone line quality caused communication error.	Try the call again. If problem continues, call Telephone Company to check your phone line.
Connection Fail	You tried to poll a fax machine that is not in Polled Waiting mode.	Verify the other party's polling setup.
Cooling Down Wait For A While	The temperature of the drum unit or toner cartridge is too hot. The machine will pause its current print job and go in to cooling down mode. During the cooling down mode, you will hear the cooling fan running while the display on the machine shows Cooling Down, and Wait For A While.	You must wait for a while for it to cool down.
Cover Open PLS Close Cover	The front cover was not completely closed.	Close the front cover for the drum unit.
Disconnected	The other party or other party's fax machine terminated the call.	Try to transmit or receive again.
Machine Error XX	Machine has a mechanical problem.	Refer to '2.2 Error Codes Shown in the "MACHINE ERROR X X" message'.

Error Message	Cause	Action
Out of Memory	You cannot store data in the memory.	(Fax sending in process) Press **Stop/Exit** button and wait until the other operations in progress finish and then try again. - OR - Clear the data in the memory. (Copy operation in process) Press **Stop/Exit** button and wait until the other operations in process finish and then try again. - OR - Clear the data in the memory. - OR - Add an optional memory. (Printing operation in process) Reduce print resolution. - OR - Clear the data in the memory. - OR - Add an optional memory.
No Response/Busy	The number you dialed does not answer or is busy.	Verify the number and try again.
Not Registered	You tried to access a One-Touch or Speed-Dial number that is not programmed.	Set up the One-Touch or Speed-Dial number.
PLS Open Cover	A page, piece of paper or paper clip, etc. may be jammed inside the machine.	Open the front cover. If you see any jammed paper or other item, gently pull it out, then close the front cover. If the error message remains, open and close the front cover again. If the machine cannot reset itself and return to the date and time prompt, it will display Machine Error XX. Refer to '2.2 Error Codes Shown in the "MACHINE ERROR X X" message'.
Paper Jam	The paper is jammed in the machine.	See Paper Jams on page 6-11.
Toner Empty	Toner cartridge is not installed. - OR - Toner is used up and printing is not possible.	Reinstall the toner cartridge. - OR - Replace the toner cartridge with a new one.
Toner Low	If the LCD shows Toner Low, you can still print. But the toner is depleted and the machine is telling you that the toner will soon run out.	Order a new toner cartridge now.

2.2 Error Codes Shown in the "MACHINE ERROR X X" message.

If the LCD shows the "PLS OPEN COVER" message, you can display the detailed error code following the MACHINE ERROR, by using the maintenance-mode function code 82 described in Chapter 7, Section 3.16.

NOTE:

- *When checking a PCB as instructed in the "Check:" column, check its harness also.*
- *To check sensors, use the maintenance-mode function code 32 described in Chapter 7, Section 3.9 (that is, press the **3** and **2** keys in the maintenance mode).*

Error Code (Hex)	Error factor	Check:
56	Front cover opened.	• Front cover
5A	Out of paper.	• Paper
6A	Heater warming-up timeout error. (Heater does not reach 60°C within 11 sec.)	• Thermistor ASSY • Halogen lamp
6B	Heater warming-up timeout error. (Heater does not reach 100°C within 15 sec.)	• Thermistor ASSY • Halogen lamp
6C	Heater temperature exceeds the maximum high temperature. (270°C or more is detected for 1 sec.)	• Thermistor ASSY • Power supply PCB
6D	Heater temperature lowers the minimum low temperature. (60°C or less is detected for 1 sec.)	• Thermistor ASSY • Power supply PCB
6E	Heater temperature does not go up enough. (Slower temperature rise rate than 2°C/5 sec. is detected.)	• Halogen lamp • Power supply PCB
6F	Heater hard limiter operates.	• Thermistor ASSY • Power supply PCB
71	Scanner motor does not synchronize with the reference clock.	• Scanner motor
72	Cannot detect Beam Detect signal.	• Scanner motor
73	Drum unit is not mounted.	• Toner sensor • Drum unit
74	Toner empty.	• Toner sensor • Toner cartridge
75	In-casing temperature error.	• Thermistor ASSY
76	Heater harness disconnected or broken.	• Thermistor ASSY • Halogen lamp
77	Power was turned off when error 76 or error 78 occurred.	
78	Heater thermistor harness disconnected or broken.	• Thermistor ASSY

Error Code (Hex)	Error factor	Check:
79	In-casing temperature sensor harness disconnected or broken.	• Thermistor ASSY • Main PCB • Engine PCB • Main motor
7A	Main motor does not synchronize with the reference clock.	
7B	ASIC error on the main PCB.	
7C	Engine PCB error.	
80	Paper size setting error.	• Paper width sensor • Paper size
81	Paper width sensor remains ON.	• Paper width sensor
82	Paper feeding error.	• Paper pick-up roller
83	Paper jam. Regist sensor, second regist sensor, or manual feed sensor remaining ON.	• Regist sensor • Main PCB
84	Paper jam. Paper eject sensor remaining ON.	• Regist sensor actuator • If the paper width sensor is defective, replace the needle tube & head flat cable ASSY. • Main PCB
85	No paper tray loaded.	• Paper tray
86	No 2nd paper tray loaded.	• Paper tray
87	Main motor stop position error.	• Main motor
88	Paper jam. Paper eject sensor remaining OFF even after regist sensor is turned OFF.	• Regist sensor actuator • If the paper width sensor is defective, replace the needle tube & head flat cable ASSY. • Main PCB
A1	Main cover opened.	• Main PCB • Scanner unit
A2	Document too long to scan.	• Document front sensor • Document rear sensor • Document sensor PCB • Document feed roller • ADF motor • Main PCB
A3	Document not detected by the document rear sensor.	
A4	Not used. (50% or more of white level data is improper.)	
A5	FAX transmission scan failure detected. First attempt	• CIS • Main PCB
A6	FAX transmission scan failure detected. Second attempt	
AA	Not used. (The document cover is not closed.)	Remove the document and close the document cover.

Error Code (Hex)	Error factor	Check:
AC	Not used. (Less than 50% of white level date is incorrect.)	
AE	Not used. (CIS home position sensor remains OFF. In other words, the CIS unit does not return to the home position.)	• CIS • Driver PCB • Main PCB
AF	Not used. (CIS home position sensor remains ON. In other words, the CIS unit remains in the home position.)	
B0	Scanner motor harness half inserted.	• Scanner motor harness
B1	Not used. (Dark level offset data level error for scanning.)	• CIS • Main PCB
B2	Not used. (Gain control data level error for scanning.)	
B3	Not used. (Scan area left edge detection error.)	• CIS • Main PCB • Black markings on the white-level reference film inside the scanner top cover
B4	Not used. (Scan area right edge detection error. 9	
B5	Not used. (Horizontal scanning edge reduction detection error in scanning area setting.)	
B6	Not used. (Horizontal scanning edge enlargement detection error in scanning area setting.)	
B7	A/D converter standard voltage failure; at High side.	
B8	A/D converter standard voltage failure; at Low side.	
B9	Scanning light source failure.	• CIS • Main PCB
BA	Not used. (Magnification failure of virtual white level.)	
BB	Scanning white level failure.	• CIS • Main PCB • White tape
BC	Not used. (Virtual white level data failure in Photo mode.)	
BD	Black level data error.	• CIS • Main PCB
BE	Not used. (Detection failure of black marks on white level standard film.)	• CIS • Driver PCB • Black markings on the white-level reference film inside the scanner top cover
BF	Not used. (ADF (Auto Document Feeder) scanning position detection failure.)	

Error Code (Hex)	Error factor	Check:
D*	Modem error.	• Main PCB
E4	Out of paper.	• Regist sensor • Main PCB
E6	Write error in EEPROM.	• Driver PCB
E8	Data scanning error during transmission.	• CIS • Main PCB
EA	Document removed at phase B.	
F5	EOL not found during page memory transfer.	• Replace the main PCB if this error occurs frequently.
F6	PC interface error.	• Interface cable • Main PCB
FA	Not used. (Scanner motor error detected.)	• Scanner motor
FF	Memory management error.	• Replace the main PCB if this error occurs frequently.

3. PAPER PROBLEMS

3.1 Paper Loading Problems

First, make sure that you are using paper that meets Brother recommended paper specifications. See 2.3 “Paper” in Chapter 1.

Problem	Remedy
The machine does not feed paper.	• If there is paper in the paper tray, make sure it is straight. If the paper is curled, you should straighten it before printing. Sometimes it is helpful to remove the paper, turn the stack over and put it back in the paper tray. • Reduce the amount of paper in the paper tray, and then try again. • Check that manual feed tray is not selected in the printer driver.
The machine does not feed paper from the manual feed tray.	• Re-insert the paper firmly, one sheet at a time. • Make sure that manual feed tray is selected in the printer driver.
The machine will not feed envelopes.	• The machine can feed envelopes from the manual feed tray. Your application software must be set up correctly to print on the envelope size you are using. This is usually done in the page setup or document setup menu of your software. Please see your software application manual.
A paper jam has occurred.	• Clear the jammed paper. Please refer to QSG.
The machine does not print into the top output tray.	• Close the back output tray.
The machine does not feed paper from the lower tray properly. (Only when the lower tray, which is optional, is used.)	• Check if the lower tray is correctly connected to the machine. • Check if an appropriate tray is selected by the printer driver.
The "Check original" message is displayed although a document is set.	• Check the sensors by using the maintenance mode function code 32. (Refer to Chapter 7, Subsection 3.9) • Check the document front sensor actuator and document rear sensor actuator. • Check the main PCB.
Document not fed.	• Check the ADF and its related sections. • Check the ADF motor and its harness. • Check the document feed roller and its related gears. • Check the main PCB.
Document double feeding.	• Check the ADF parts.
Document jam.	• Check the ADF motor.

3.2 Original Jams

Based upon where the original or printed sheet is jammed, follow the appropriate set of instructions to remove it.

3.2.1 Original is jammed in the ADF (Automatic document feeder)

(1) Open the control panel cover.

(2) Pull the jammed document to the front and remove it.

(3) Close the control panel cover and press **Stop/Exit** button.

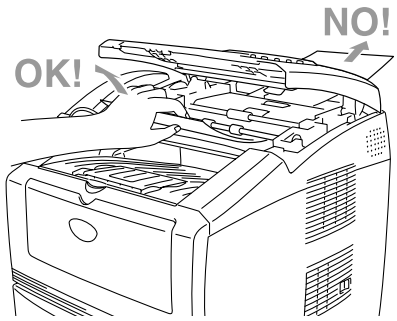


Fig. 6-1

3.3 Paper Jams

3.3.1 Clearing jammed paper

Clear the jammed paper following the procedures below;

(1) Pull the paper tray completely out of the machine.

(2) Pull the jammed paper up and out of the machine.

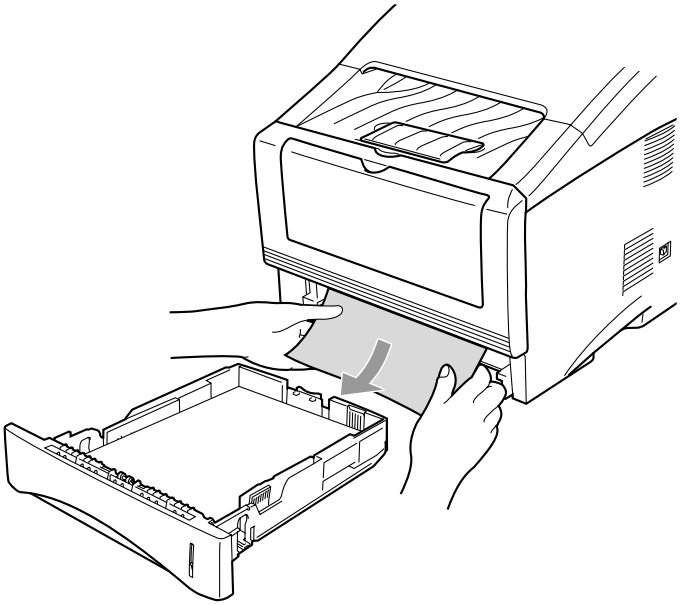


Fig. 6-2

(3) Press the front cover release button and then open the front cover.

(4) Pull out the drum unit. Pull the jammed paper up and out of the machine. If you cannot remove the drum unit easily at this time, do not use extra force. Instead, pull the edge of the jammed paper from the paper tray.

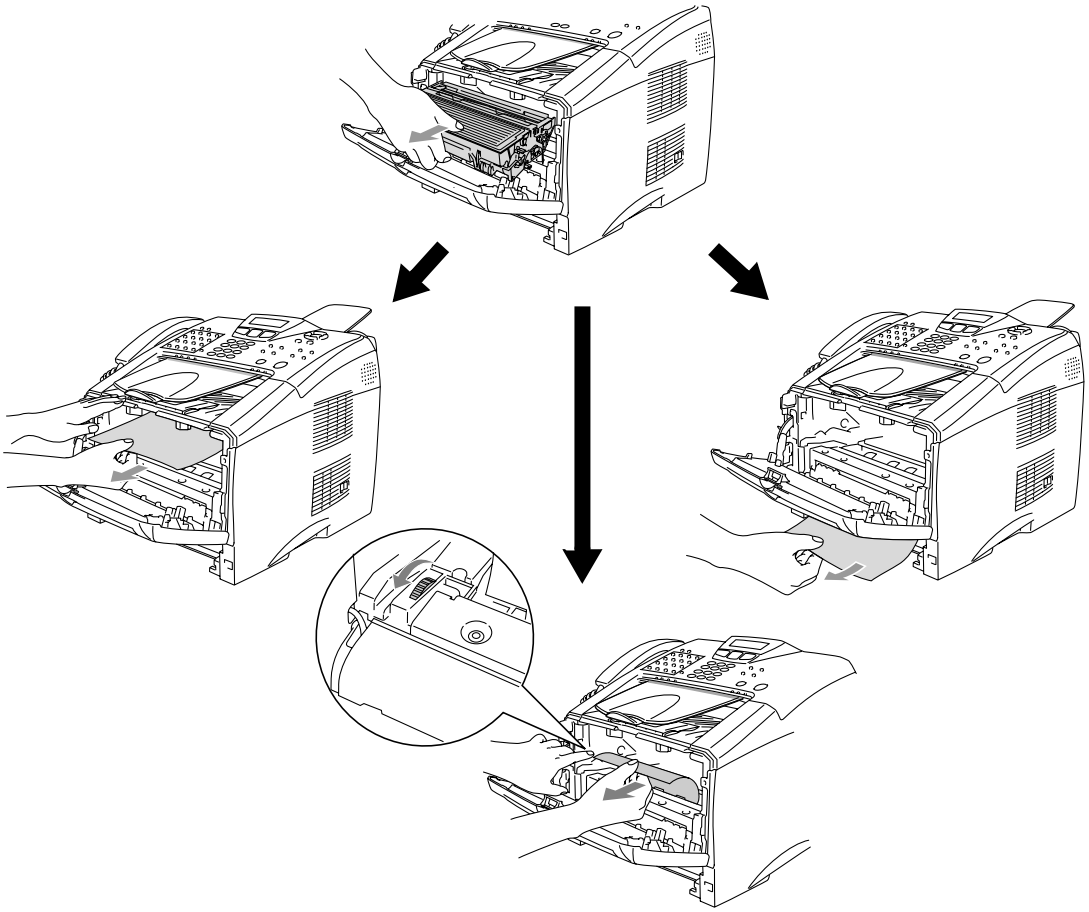


Fig. 6-3

> ***CAUTION:***
> *To prevent damage to the machine caused by static electricity, do not touch the electrodes shown in Figure 6-4.*

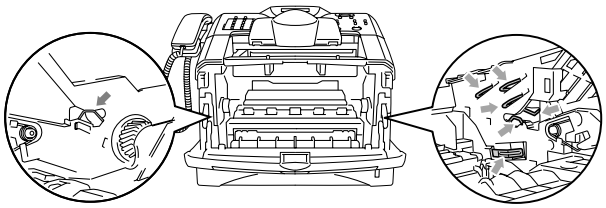


Fig. 6-4

(5) Open the back output tray. Pull the jammed paper out of the fixing unit. If the paper jam can be cleared, go to Step 7.

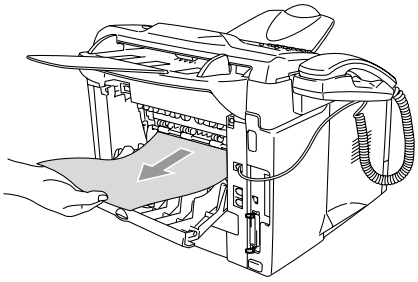


Fig. 6-5

NOTE:

If you have to pull the paper toward the back of the machine, the fuser may get dirty with toner powder and it may scatter on the next printouts. Print a few copies of the test page until the scattering of toner stops.

> ***CAUTION:***
> *After you have just used the machine, some internal parts of the machine are extremely hot! Wait for the machine to cool down before you touch the internal parts of the machine.*

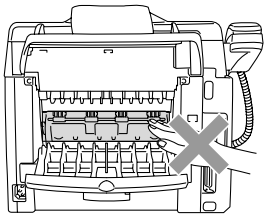


Fig. 6-6

(6) Release the jam clear cover and take out the jammed paper.

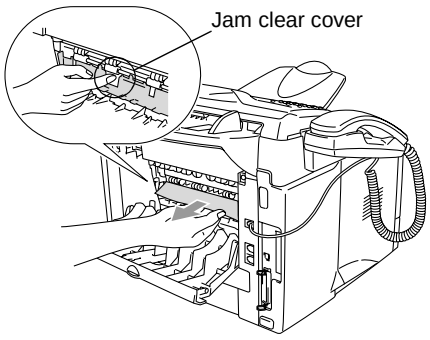


Fig. 6-7

(7) Close the jam clear cover. Close the back output tray.

(8) Push the lock lever down and take the toner cartridge out of the drum unit. Take out the jammed paper if there is any inside the drum unit.

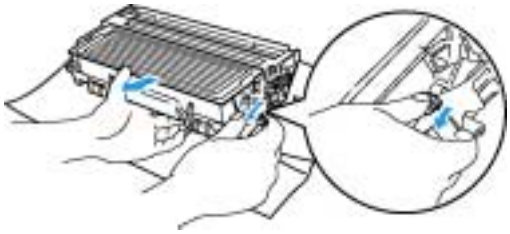


Fig. 6-8

(9) Install the toner cartridge on the drum unit, and then install the drum unit on the machine.

(10) Put the paper tray in the machine.

(11) Close the front cover.

3.3.2 Causes & countermeasures

The causes for paper jam problems vary depending on the location of the paper jam. When a paper jam occurs inside the machine, you have to find the location of the paper jam first, remove the jammed paper and then take the appropriate countermeasure referring to the table below;

Problem	Type of Jam	Cause	Remedy
Jam when the machine is turned on.	Paper stuck	The front regist sensor or paper eject sensor is turned on.	Remove the paper inside the machine. If there is no paper, check the suspect sensors referring to '3.9 Sensor Operational Check' in Chapter 7.
Top of paper stopped at 350mm from the second exit roller. Next paper is not fed.	Jam caused by paper length detected as longer than 400mm (16 in).	The front regist sensor is not returning properly and is not turning off.	Check front regist sensor motion referring to '3.9 Sensor Operational Check' in Chapter 7.
Bottom of paper stopped around the transfer roller.	Jam caused by paper length detected as shorter than 80mm.	The front regist sensor was turned off early. Malfunction of actuator or hardware noise.	Check the front regist sensor referring to '3.9 Sensor Operational Check' in Chapter 7.
Top of paper stopped between the paper feed roller and the pick-up roller.	Jam caused by a paper feed delay.	Paper was not fed in at the proper timing due to paper dust or wear of the rubber pick-up roller.	Remove the paper dust attached to the pick-up roller. If the rubber is worn out, replace it with a new one.
Top of paper stopped at 50mm from the contact point of the heat roller and pressure roller.	Jam caused by the paper not being sensed when ejected from the paper eject sensor.	The paper eject sensor is not working properly and has not turned off. (single printing)	Check sensor motion referring to '3.9 Sensor Operational Check' in Chapter 7.
Jam after paper is ejected.	Jam caused by the paper not being sensed when ejected from the paper eject sensor.	The paper eject sensor or front regist sensor is not working properly and has not turned off. (continuous printing)	Check sensor motion referring to '3.9 Sensor Operational Check' in Chapter 7.

3.4 Paper Feeding Problems

Even if the paper is printed and ejected without any problems such as paper jams, paper feeding problems below may appear.

Users can clear these problems by following the 'User Check' items for each problem. Even if the same problem occurs again, follow the procedures in the table below.

F-1	Double feeding

User Check

Check the paper used meets the recommended paper specifications.

Possible cause	Step	Check	Result	Remedy
Separation pad	1	Is the surface of the separation pad worn out?	Yes	Replace the separation pad.

F-2	Wrinkles or creases

User Check

(1) Check that paper is loaded into the paper tray correctly.

(2) Check the paper used meets the recommended paper specifications.

(3) Try printing using the straight-through output path.

(4) Turn over the stack of paper in the cassette or try rotating the paper 180° in the cassette.

Possible cause	Step	Check	Result	Remedy
Paper	1	Is the problem solved if new paper is used?	Yes	Instruct the user how to store paper so that it does not absorb moisture.
Fixing unit entrance guide	2	Is the entrance guide dirty?	Yes	Clean the entrance guide.
Fixing unit	3	Is the pressure roller dirty?	Yes	Clean the pressure roller.
			No	Replace the fixing unit.

F-3	Page skew

User Check

(1) Check that the paper or other media is loaded into the paper tray correctly and that the paper guides are not too tight or too loose against the paper stack.

(2) If using the manual feed tray, check how to load paper into the manual feed tray correctly.

(3) The paper tray may be too full. Load paper below 27mm in depth.

(4) Check the paper used meets the recommended paper specifications.

F-4	Curl or Wave

User Check

(1) Check the paper used meets the recommended paper specifications. Both high temperature and humidity will cause paper to curl.

(2) If the machine is used infrequently, the paper may have sat for too long in the paper tray . Turn over the stack of paper in the paper tray . Also, try rotating the paper 180° in the paper tray .

(3) Try printing using the straight-through output path.

NOTE:

For no paper supplied as the cause of a malfunction, see M-4 'No paper supplied' in 6. 'MALFUNCTIONS' in this Chapter.

4. SOFTWARE SETTING PROBLEMS

The machine may not print the data correctly if there are incorrect software settings.

S-1	"There was an error writing to LPT1: (or BRUSB) for the machine" error message appears.

User Check

(1) Check that the printer cable is not damaged or broken. Check also that the cable is connected to the correct interface connectors of both the machine and PC.

(2) Check that the correct machine is selected if you have an interface switching device.

(3) Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct print port is set for the selected printer driver.

(4) Check that the machine is not connected to the same port which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the machine only. Turn off the printer status monitor in the device options tab in the printer driver.

(5) If the print port is set as an ECP port, change it to a normal port.

(6) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Main PCB failure	1	Is it possible to print with another PC and printer cable?	No	Replace the main PCB.
			Yes	This problem may appear under the specified system environment. Check the environment which the user used.

S-3	Although the USB driver is installed, it is unable to find the BRUSB: port. (Windows98/Me only)

User Check

(1) Re-install, according to the instruction of the subsection 3.2 in Chapter 2.

(2) Try to connect the machine directly to the computer if it is connected through a USB hub.

Possible cause	Step	Check	Result	Remedy
Computer Operating System	1	Windows 95 or Windows NT4.0?	Yes	Not supported.
Computer settings	2	Does 'Universal Serial Bus Controllers' appear in the Device Manager tab of 'System Properties' in control panel?	No	This problem can be caused by your computer settings. See the computer manual.
USB cable/ machine damage	3	Does "Add New Hardware Wizard" appears on the screen or Does test print complete?	No	The USB cable is damaged. Replace the cable. If the same problem appears, the machine will be damaged.

S-4	This machine does not appear in Chooser with iMac and Power Macintosh G3 with USB.

User Check

(1) Check the machine is turned on.

(2) Check the USB interface cable is connected correctly.

(3) Check the printer driver is installed correctly.

Possible cause	Step	Check	Result	Remedy
Machine connection	1	Select 'Apple System Profiler' in Apple Menu. Are the following items indicated in the USB box of the Device and Volumes tab? • Product ID: 0x16 • Vender: Brother International Corporation (or 0x4f9)	No	Check the machine is turned on and the USB interface cable is connected correctly. Check that the USB cable used is the shielded twisted pair type and 5 m or less. Try to connect the machine and PC with the USB cable directly.
Driver installation	2	Are there the following files in the Extensions Folder of System Folder? <For System 8.6 or higher> • BR_PrintMoniter(USB) • Brother Laser	No	Try to re-install the printer driver.
			Yes	Turn off the machine and PC power switch, and check all connections between them. Then, turn them on again.

S-4	This machine does not appear in Chooser with iMac and Power Macintosh G3/G4 with USB.

User Check

(1) Check the machine is turned on.

(2) Check the USB interface cable is connected correctly.

(3) Check the printer driver is installed correctly.

Possible cause	Step	Check	Result	Remedy
Machine connection	1	Select 'Apple System Profiler' in Apple Menu. Are the following items indicated in the USB box of the Device and Volumes tab? • Product ID: 0x18 • Vender: Brother International Corporation (or 0x4f9)	No	Check the machine is turned on and the USB interface cable is connected correctly. Check that the USB cable used is the shielded twisted pair type and 5 m or less. Try to connect the machine and PC with the USB cable directly.

**NOTE:*
The value or alphabet following 'BR' is a product ID.

5. MALFUNCTIONS

When taking countermeasures for malfunctions as described in this section, check connectors for contact failure before measuring the voltage at the specified connector pins.

M-1	No AC power supplied

Possible cause	Step	Check	Result	Remedy
Supply voltage	1	Is the correct voltage present at the outlet?	No	Inform the user that the correct voltage is not supplied at the outlet.
Power plug	2	Is the power cord securely plugged into the outlet?	No	Plug the power cord securely into the outlet.
Fuse (F1, F2)	3	Is the fuse blown?	Yes	If the fuse blows again immediately after replacing the low-voltage power supply PCB, check that there is not a short circuit somewhere in the AC power supply line.
Wiring	4	Unplug the power supply plug. Is there a broken wire between the AC input connector of the low-voltage power supply and the power plug?	Yes	Replace the AC power cord.

M-2	No DC power supplied

Possible cause	Step	Check	Result	Remedy
AC power supply	1	Is AC power supplied between connectors CN1-L and CN1-N when the power plug is plugged into the outlet?	No	Follow the same check procedure of M-1 “No AC power supplied”.
Wiring, DC load	2	Turn on the power switch. Measure the voltages between the terminals. Do the measured voltage satisfy the prescribed valued in the table below?	Yes	Turn off the power switch, reconnect the connector and turn the power switch on again. If the protector circuit is activated, check the connector, the wiring from the connector, and the DC load.
Low-voltage power supply PCB	3	Refer to the chart *1 below.	No	Replace the low-voltage power supply PCB.

*1

PCB	+lead pin	- lead pin	Voltage
Engine	CN8-3 CN10-6	CN8-2 CN10-5	Approx. 24V Approx. 3.3V

WARNING

If you analyze malfunctions with the power plug inserted into the power outlet, special caution should be exercised even if the power switch is OFF because it is a single pole switch.

M-3	Main motor failure

Possible cause	Step	Check	Result	Remedy
Failure of connector	1	Is the connection of connector CN9 on the engine PCB correct?	No	Reconnect the connector.
Main motor	2	Is the problem solved by replacing the main motor?	No	Replace the main motor.
Engine PCB	3	Is the problem solved by replacing the engine PCB?	No	Replace the engine PCB.
Main PCB	4	Is the problem solved by replacing the main PCB?	No	Replace the main PCB.

M-4	No paper supplied

Possible cause	Step	Check	Result	Remedy
Separation pad / paper pick-up roller failure	1	Is the surface of the separation pad or the paper pick-up roller dirty or worn out?	Yes	1) Clean the surface of the separation pad or paper pick-up roller. 2) Replace the separation pad or paper pick-up roller.
Failure of connector	2	Is the contact of the solenoid connector on the engine PCB good?	No	Reconnect the connector.
Engine PCB circuit	3	Set paper in the manual feed tray and make a test print by pressing the control panel button.	No	Replace the engine PCB.
Paper pick-up clutch solenoid		Does the voltage between pins 2 (solenoid) and 1 (24V) of the CN16 connector on the engine PCB change from approx. 24V DC to 0V within the specified time?	Yes	Replace the paper pick-up clutch solenoid.
Main PCB	4	Is the problem solved by replacing the main PCB?	No	Replace the main PCB.

M-5	Insufficient output from high-voltage power supply unit

Possible cause	Step	Check	Result	Remedy
High-voltage contact	1	Do any of the terminals on the high-voltage contacts have dirt or contact burns?	Yes	Clean the terminals.
High-voltage power supply PCB	2	Check the connections of the connector between the high-voltage power supply and the engine PCB are secured correctly.	Yes	Replace the high-voltage power supply PCB.
			No	Reconnect the connector between the high-voltage power supply and the engine PCB.

M-6	Fixing heater temperature failure

Possible cause	Step	Check	Result	Remedy
Poor thermistor harness contact	1	Is the contact of connector CN7 on the engine PCB good?	No	Reconnect the connector.
Blown thermal fuse	2	Remove the fixing unit and measure the resistance of the thermal fuse. Is it open circuit?	Yes	Replace the fixing unit.
Thermistor failure	3	Is the thermistor installed properly?	Yes	Replace the fixing unit.
			No	Reinstall the thermistor properly.
Halogen heater lamp failure	4	Remove the fixing unit and measure the resistance of the halogen heater lamp. Is it open circuit?	Yes	Replace the halogen heater lamp.

M-7	Laser Unit failure

Possible cause	Step	Check	Result	Remedy
Harness connection failure (1)	1	Is the LD harness connector on the main PCB secured correctly?	No	Reconnect the connector securely.
			Yes	Replace the laser unit.
Harness connection failure (2)	2	Is the polygon motor connector on the engine PCB secured correctly?	No	Reconnect the connector securely.
			Yes	Replace the laser unit.

M-9	Fixing Unit failure

Possible cause	Step	Check	Result	Remedy
Poor thermistor harness contact	1	Is the contact of connector CN7 on the engine PCB good?	No	Reconnect the connector.
Blown thermal fuse	2	Remove the fixing unit and measure the resistance between the input connectors. Is it open circuit?	Yes	Replace the fixing unit.
Thermistor failure	3	Is the thermistor installed properly?	Yes	Replace the fixing unit.
			No	Reinstall the thermistor properly.
Halogen heater lamp failure	4	Remove the fixing unit and measure the resistance of the halogen heater lamp. Is it open circuit?	Yes	Replace the halogen heater lamp.
Heater harness connection failure	5	Is the heater harness connector connected to the low-voltage power supply PCB and fixing unit secure?	No	Reconnect the connectors securely.

NOTE:

- *This problem will be cleared if leaving the printer power ON for ten minutes.*
- *If the heater is cooled down sufficiently, this problem may be cleared by enter the maintenance mode after press **9** key twice. **Be warned, however, that this operation will melt the fixing unit if the heater is hot.***

M-10	Main PCB failure

Possible cause	Step	Check	Result	Remedy
Main PCB failure	1	Is it possible to copy?	No	Replace the main PCB.
Software bug	2	Does this problem appear when printing specific data or printing under a specific environment?	Yes	Inform the Brother office of the used specific data, machine condition and system environment.

M-12	Engine PCB failure

Possible cause	Step	Check	Result	Remedy
Fixing unit ground wire connection	1	Is the ground wire on the fixing unit secured with the shoulder screw correctly?	No	Secure the ground wire correctly with the shoulder screw.
Harness connection failure	2	Is the connection of the connector between the main PCB and the engine PCB connected correctly?	No	Reconnect the connectors securely.
Engine PCB failure	3	Is the problem solved by replacing the engine PCB?	No	Replace the engine PCB.
Main PCB failure	4	Is the problem solved by replacing the main PCB?	No	Replace the main PCB.

M-14	DIMM failure

Possible cause	Step	Check	Result	Remedy
DIMM failure	1	Try installing DIMM into another machine, then check the memory size in Print Settings.	Yes	Replace the main PCB.
		Is it possible to print the data?	No	Replace the DIMM.

6. TROUBLESHOOTING OF THE CONTROL PANEL

L-1	Nothing is displayed on the LCD.

User Check

(1) Verify if the power switch is turned off.

Possible cause	Step	Check	Result	Remedy
Connection between main PCB, and control panel PCB	1	Main PCB and control panel PCB are properly connected.	No	Fix the connector properly.
Harness between main PCB, and control panel PCB	2	Harness wire is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and low-voltage power supply PCB	3	Main PCB and low-voltage power supply PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and low-voltage power supply PCB	4	Harness wire is damaged.	Yes	Replace the harness with a normal part.
LCD	5	Replacement of LCD solves the problem.	Yes	Replace the LCD with a normal part.
Control panel PCB	6	Replacement of control panel PCB solves the problem.	Yes	Replace the control panel PCB with a normal part.
Low-voltage power supply PCB	7	Replacement of low-voltage power supply PCB solves the problem.	Yes	Replace the low-voltage power supply PCB with a normal part.
Main PCB	8	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

L-2	The control panel does not work.

User Check

(1) No

Possible cause	Step	Check	Result	Remedy
Key sticking	1	Any key on control panel is stuck.	Yes	Clean up the panel cover, or remove the burrs from panel cover and panel keys.
Connection between main PCB and control panel PCB	2	Main PCB and control panel PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and control panel PCB	3	Harness wire is damaged.	Yes	Replace the harness with a normal part.
Connection of FPC key	4	FPC key is properly connected.	No	Fix the connection properly.
FPC key	5	Replacement of FPC key solves the problem.	Yes	Replace the FPC key with a normal part.
Control panel PCB	6	Replacement of control panel PCB solves the problem.	Yes	Replace the control panel PCB with a normal part.
Main PCB	7	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

L-3	Printing from Macintosh applications fails.

User Check

(1) Verify that the printer driver supplied with the printer has been installed in the system folder and selected in the selector.

(2) Check the port selected in the selector. The selected port has to match the actual port to which the printer cable is connected.

Possible cause	Step	Check	Result	Remedy
Fault in machine	1	Test page can be printed using the method described in 3.4 'Test Pattern 1' in Chapter 7.	No	Check the symptom of the problem and refer to an appropriate section in this Chapter to solve the problem.
Breakage of main PCB	2	Printing can be made using an appropriate PC, printer cable, and RS-100M ?	No	Replace the main PCB.

7. TROUBLESHOOTING OF TELEPHONE/FAX FUNCTIONS

F-1	FAX transmission cannot be made/Telephone call cannot be placed

User Check

(1) Verify that the telephone cord is securely inserted.

Possible cause	Step	Check	Result	Remedy
Dialing mode setting	1	Dialing signal (PB or DP) comes out normally in each mode. (Use telephone line emulator.)	Yes	Check the dialing mode setting at customer's again. Check the telephone line cord between machine and socket.
Connection between main PCB and NCU PCB	2	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	3	Harness wire is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and control panel PCB	4	Main PCB and control panel PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and control panel PCB	5	Harness wire is damaged.	Yes	Replace the harness with a normal part.
Connection of FPC key	6	FPC key is properly connected.	No	Fix the connection properly.
FPC key	7	Replacement of FPC key solves the problem.	Yes	Replace the FPC key with a normal part.
NCU PCB	8	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Control panel PCB	9	Replacement of control panel PCB solves the problem.	Yes	Replace the control panel PCB with a normal part.
Main PCB	10	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

F-2	Speed dialing and One-touch dialing can't be used.

Possible cause	Step	Check	Result	Remedy
Speed dialing, One-touch dialing	1	A fax transmission can be made using the key, ten?	Yes	Replace the main PCB.
Dialing mode setting	2	Dialing signal (PB or DP) comes out normally in each mode. (Use telephone line emulator.)	Yes	Check the dialing mode setting at customer's again. Check the telephone line cord between machine and socket.
Connection between main PCB and NCU PCB	3	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	4	Harness wire is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and control panel PCB	5	Main PCB and control panel PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and control panel PCB	6	Harness wire is damaged.	Yes	Replace the harness with a normal part.
Connection of FPC key	7	FPC key is properly connected.	No	Fix the connection properly.
FPC key	8	Replacement of FPC key solves the problem.	Yes	Replace the FPC key with a normal part.
NCU PCB	9	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Control panel PCB	10	Replacement of control panel PCB solves the problem.	Yes	Replace the control panel PCB with a normal part.

F-3	FAX can't be received.

User Check

(1) Verify that the telephone cord is securely inserted.

Possible cause	Step	Check	Result	Remedy
Receive mode setting	1	Receive mode is set to automatic receive mode.	No	Set the receive mode to automatic receive mode.
NCU PCB	2	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Main PCB	3	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

F-4	No bell ring.

Possible cause	Step	Check	Result	Remedy
Ring delay	1	Ring delay is set to "0".	Yes	Set the ring delay to other than "0".
Ring volume	2	Ring volume is set to "OFF".	Yes	Set the ring volume to other than "OFF".
Connection between main PCB and scanner unit	3	Main PCB and scanner unit are properly connected.	No	Fix the connection properly.
Harness between main PCB and scanner unit	4	Harness wire is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and NCU PCB	5	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	6	Harness wire is damaged.	Yes	Replace the harness with a normal part.
Speaker	7	Replacement of speaker solves the problem.	Yes	Replace the speaker with a normal part.
NCU PCB	8	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Main PCB	9	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

F-5	Speaker is silent during on-hook dialing.

Possible cause	Step	Check	Result	Remedy
Connection between main PCB and speaker	1	Main PCB and speaker are properly connected.	No	Fix the connection properly.
Speaker	2	Replacement of speaker solves the problem.	Yes	Replace the speaker with a normal part.
Connection between main PCB and NCU PCB	3	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	4	Harness wire is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and control panel PCB	5	Main PCB and control panel PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and control panel PCB	6	Harness wire is damaged.	Yes	Replace the harness with a normal part.
NCU PCB	7	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Main PCB	8	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

F-6	Dialing function does not switch between "tone" and "pulse".

Possible cause	Step	Check	Result	Remedy
Connection between main PCB and NCU PCB	1	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	2	Harness wire is damaged.	Yes	Replace the harness with a normal part.
NCU PCB	3	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Main PCB	4	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

F-7	No dial tone

Possible cause	Step	Check	Result	Remedy
Connection between main PCB and NCU PCB	1	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	2	Harness wire is damaged.	Yes	Replace the harness with a normal part.
NCU PCB	3	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Main PCB	4	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

8. IMAGE DEFECTS

8.1 Image Defect Examples

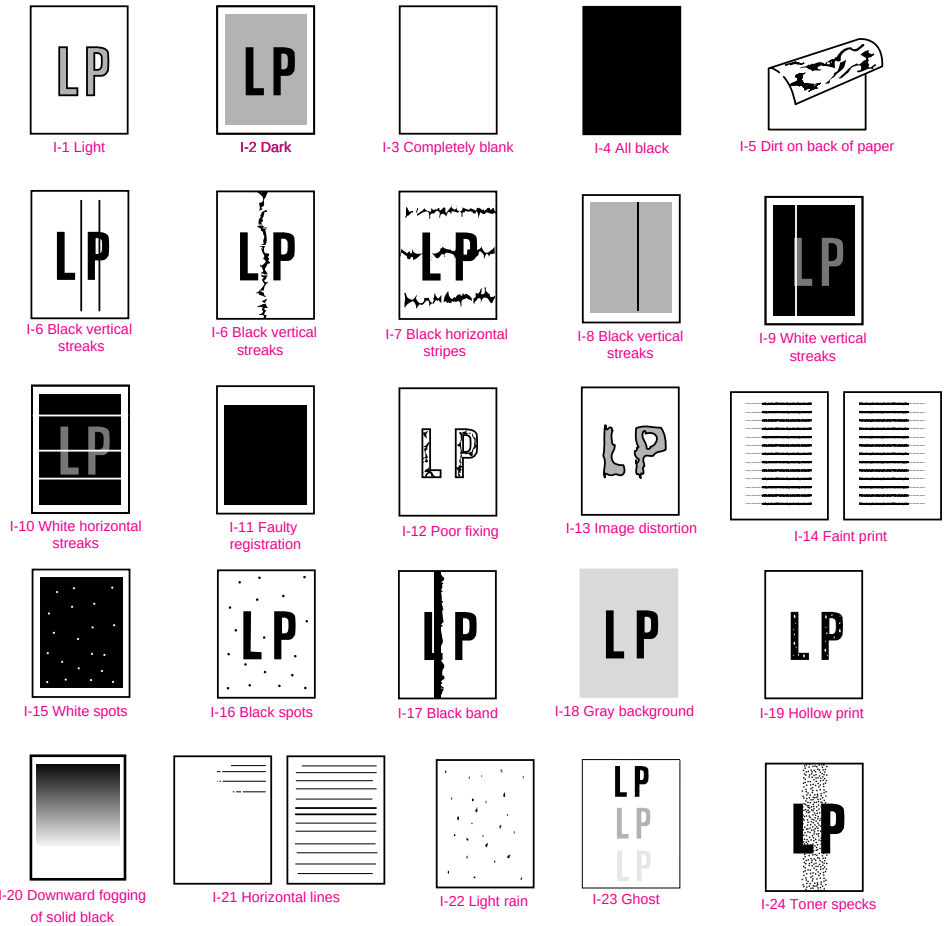


Fig. 6-9

8.2 Diameter of Rollers

The diameter of each roller and the pitch which appears in the image are listed below;

No.	Parts Name	Diameter (The pitch which appears in the image)
1	First Paper Feed Roller	ϕ 13.6 mm (42.7 mm)
2	Paper Feed Roller	ϕ 14.0 mm (44.0 mm)
3	Transfer Roller	ϕ 15.20 mm (47.7 mm)
4	Photosensitive Drum	ϕ 29.97 mm (94.1 mm)
5	Heat Roller	ϕ 25.0 mm (78.5 mm)
6	Pressure Roller	ϕ 25.0 mm (78.5 mm)
7	Development Roller	ϕ 20.0 mm (39.0 mm)

8.3 Troubleshooting Image Defect

Several types of the image defects can be cleared by end users. For those defects, instruct the user to check the 'User Check' items described in each table. Even if the same image defect appears, the following procedures should be followed in the event of specific image defects.

See also subsection 8.4 'Location of Ground Contacts' in this Chapter for information about the location of the grounding contacts.

> ***CAUTION:***
> *When using the machine for a special job, such as printing of name cards, print quality cannot be guaranteed.*

I-1	Light

User Check

(1) Check the printer's environment. Conditions such as humidity, high temperatures, etc. may cause this situation to occur.

(2) If the whole page is light, toner save mode may be on. Disable toner save mode within Printer Properties tab of the driver.

(3) Try installing a new toner cartridge or drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Toner sensing failure (machine side)	1	Can printing be started with the drum unit and toner cartridge removed?	Yes	Check if the toner sensor is dirty and check the toner sensor connection.	
Toner sensing failure (toner cartridge side)	2	Is the problem solved when 4 or 5 pages are printed after the toner cartridge is replaced with a full one?	Yes	The wiper of the toner cartridge is defective. Replace the toner cartridge.	
Drum connection failure	3	Are all the contacts between the drum unit and machine connected correctly?	No	Clean contact electrodes both on the drum unit and in the machine.	(1), (4), (5), (6)
High-voltage power supply PCB failure	4	Is the harness connection between the high-voltage power supply PCB and the engine PCB correct?	Yes	Replace the high-voltage power supply PCB.	
Engine PCB / Main PCB failure	5	Is the harness connection between the engine PCB and the main PCB correct?	Yes	Replace the engine PCB or the main PCB.	
Dirt on the scanner window	6	Is there any dirt on the scanner window?	Yes	Wipe it off with a soft clean paper.	
Laser unit failure	7	Is the problem solved after replacing the laser unit?	Yes	Replace the laser unit.	

I-2	Dark

LP

User Check

(1) Check the paper used meets the recommended paper specifications.

(2) Check the machine's environment. High temperature and high humidity conditions can increase the amount of background shading.

(3) Clean the corona wire with the wire cleaner.

(4) Try installing a new toner cartridge or drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona wire failure (contact failure)	1	Are the charge electrodes between the machine and the drum unit dirty?	Yes	Clean both electrodes.	(3)
Drum unit failure	2	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit with a new one.	
Toner cartridge failure	3	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge with a new one.	
High-voltage power supply PCB failure	4	Is the connections of the connector between the high-voltage power supply PCB and the engine PCB secured correctly?	Yes	Replace the high-voltage power supply PCB.	
Main PCB failure	5	Are there any disconnected connectors?	No	Replace the main PCB.	
Engine PCB failure	6	Are there any disconnected connectors?	No	Replace the engine PCB.	

I-3	Completely blank

User Check

(1) Check for the setting of originals.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Developing bias contact failure	1	Are the developing bias contacts between the machine body and drum unit dirty?	Yes	Clean the electrodes at both sides.	(4)
Drum unit	2	Are the drum shaft and drum electrode of the machine connected correctly?	Yes	Clean the shaft and the electrode.	(1)
			No	Check the connection between the shaft and the electrode.	(1)
Drum unit failure	3	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.	
Toner cartridge failure	4	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge with a new one.	
Scanner harness connection failure	5	Is the scanner harness connected securely? (Check if there is any play in the connection.)	No	Reconnect the connector correctly.	
Main PCB failure	6	Are printing signals being input to the laser unit? Is the problem solved after replacing the main PCB?	Yes	Replace the main PCB.	
Laser unit failure	7	Is the scanner interlock lever damaged?	Yes	Replace the laser unit.	
		Is the scanner mirror broken or loose?	No	Replace the high-voltage power supply PCB.	
CIS unit	8	Is the problem occurring on CIS replacement?	Yes	Replace the CIS.	

I-4	All black

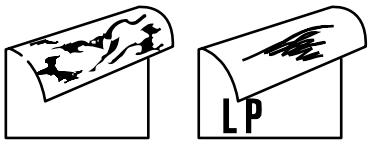
User Check

(1) Clean the corona wire of the drum unit.

(2) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona wire failure	1	Is the corona wire dirty?	Yes	Clean the corona wire with the wire cleaner.	(2)
	2	Is the corona wire broken?	Yes	Replace the drum unit.	
	3	Are the charge electrodes between the machine and the drum unit dirty?	Yes	Clean both electrodes.	(3)
Harness connection	4	Is the laser unit connected to the main PCB correctly?	No	Connect the harness between the laser unit and the main PCB correctly.	
High-voltage power supply PCB failure	5	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	
Main PCB failure	6	Is the problem solved after replacing the main PCB?	Yes	Replace the main PCB.	
CIS unit	7	Is the problem occurring on CIS replacement?	Yes	Replace the CIS.	

I-5	Dirt on the back of paper



Possible cause	Step	Check	Result	Remedy
Fixing unit dirty	1	Is the pressure roller dirty? Is any other area in the machine dirty?	Yes	Clean the pressure roller referring to the following procedure.
Dirt in the drum unit	2	Is the transfer roller dirty? Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit
			No	Replace the high-voltage power supply PCB.

NOTE:
This problem may disappear after printing approximately 5 pages of completely blank sheets.

How to clean the pressure roller

Clean the pressure roller as follows.

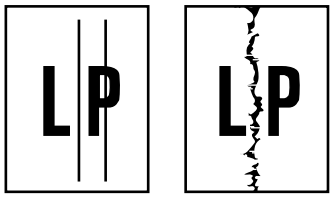
(1) Set ten or more sheets of paper in the paper tray.

(2) Check the absence of paper in the ADF and the paper tray.

(3) Press **Copy** button to copy and repeat it five times.

(4) Check whether any stain are observed on the back of paper or not.

I-6	Black and blurred vertical streaks



User Check

(1) Clean the corona wire in the drum unit.

(2) Check that the corona wire cleaner is at the home position.

(3) Check that the toner cartridge is not empty.

(4) The drum unit may be damaged. Install a new drum unit.

(5) The toner cartridge may be damaged. Install a new toner cartridge.

Possible cause	Step	Check	Result	Remedy
Dirt on the scanner window.	1	Is there any dirt on that?	Yes	Clean the scanner window.
Dirt on the white tape.	2	Is there any dirt on that?	Yes	Clean the white tape.
Dirt on the CIS.	3	Is there any dirt on that?	Yes	Replace the CIS.
Corona wire failure	4	Is the vertical block streak about 10mm wide? (Check if the wire cleaner is at its home position.)	Yes	Return the wire cleaner to its home position.
Dirt in the paper feed system	5	Is the paper tray or feed system on the drum unit dirty with toner?	Yes	Clean the toner off.
Scratch on the drum	6	Is the drum surface scratched?	Yes	Replace the drum unit.
Dirt on the drum.	7	Is the drum surface dirty with toner in streaks?	Yes	Replace the drum unit.
Scratch on the heat roller	8	Is the surface of the heat roller scratched?	Yes	Replace the fixing unit.

NOTE:

- *If you print the same pattern continuously, the drum will be worn and black vertical streaks will appear on the paper.*
- *This problem may occur with noise due to the corona wire being dirty. In that case, clean the corona wire with the wire cleaner.*

I-7	Black and blurred horizontal stripes

User Check

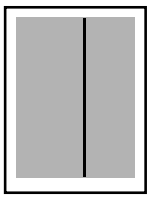
(1) The drum unit may be damaged. Install a new drum unit.

(2) Check the paper used meets the recommended paper specifications.

(3) Clean the machine interior and the corona wire in the drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Scratch on the drum	1	Are the horizontal stripes at 94mm (photosensitive drum) intervals?	Yes	The photosensitive drum was scratched. Replace the drum unit.	
Toner stuck on the development roller	2	Are the horizontal stripes at 39mm (development roller) intervals?	Yes	After printing several pages, the problem will disappear. If not, replace the toner cartridge.	
Scratch on the heat roller	3	Are the horizontal stripes at 79mm (heat roller) intervals?	Yes	Replace the heat roller.	
Dirt on the charge electrodes.	4	Are the charge electrodes between the machine and the drum unit dirty?	Yes	Clean both electrodes.	(3)
High-voltage power supply PCB failure	5	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	

I-8	Black vertical streaks (in a gray background)



Possible cause	Step	Check	Result	Remedy	Ground contacts
Translucent stain on the scanner window	1	Is there any dirt on the scanner window?	Yes	1) Clean the scanner window. 2) If it is not effective, replace the laser unit.	
Corona wire failure	2	Is the corona wire dirty?	Yes	Clean the corona wire with the wire cleaner.	(2)

I-9	White vertical streaks

User Check

(1) Try to wipe the scanner window with a soft cloth.

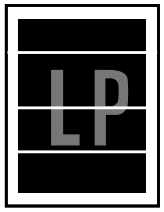
(2) The toner cartridge may be damaged. Install a new toner cartridge.

(3) Check the machine's environment. High temperature and high humidity conditions can cause this problem.

(4) Damp (wet) paper might be used. Try to change to freshly unpacked paper.

Possible cause	Step	Check	Result	Remedy
Dirt on the CIS.	1	Is there any dirt on that?	Yes	Replace the CIS.
Dirt on the white tape.	2	Is there any dirt on that?	Yes	Clean the white tape.
Transfer failure	3	Is the transfer roller scratched?	Yes	Replace the drum unit.
Condensation	4	Has condensation occurred inside the machine?	Yes	Try to print several pages or leave the machine 2 hours to allow it to reach room temperature.

I-10	White horizontal stripes



User Check

(1) Check the paper used meets the recommended paper specifications. A rough surfaced paper, damp paper or thick media can cause the problem.

(2) Check that the appropriate media type is selected in the printer driver.

(3) The problem may disappear by itself. Try printing multiple pages to clear this problem especially if the machine has not been used for a long time.

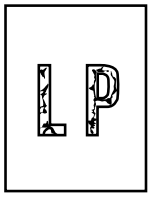
(4) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Developing bias contact failure	1	Are the developing bias contacts between the machine and toner cartridge dirty?	Yes	Clean the electrodes at both sides.	(4)

I-11	Faulty registration

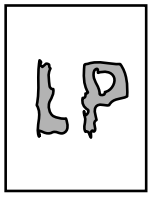
Possible cause	Step	Check	Result	Remedy
Excessive paper load	1	Is the paper loaded in the paper tray more than 27mm high?	Yes	Instruct the user to keep paper loads below 27mm in depth.
Paper	2	Is the specified weight of the recommended paper being used?	No	Recommend to use the specified types of paper.
	3	Is the first printing position within ±1mm of the tolerance specification?	Yes	Adjust the Y offset by using the utility software supplied.
Rear regist sensor position incorrect	4	Is the position of the rear regist sensor normal?	No	Reposition the sensor to the correct position.

I-12	Poor fixing



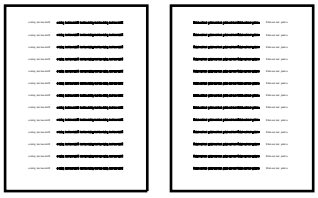
Possible cause	Step	Check	Result	Remedy
Paper	1	Is thick paper of more than 158 g/m^2 being used?	Yes	Recommend to use the specified types of paper.
Toner sensor failure	2	Is the problem solved by replacing the drum unit or the toner cartridge?	Yes	1) If toner is out, replace the toner cartridge. 2) The toner sensor is defective. Clean the toner sensor. 3) If the wiper in the toner cartridge is broken, replace the toner cartridge with a new one.
Fixing unit thermistor failure	3	Is the thermistor fitted correctly?	No	Fit the thermistor correctly.
Low-voltage power supply PCB failure	4	Is the problem solved by replacing the low-voltage power supply PCB?	Yes	Replace the low-voltage power supply PCB.

I-13	Image distortion



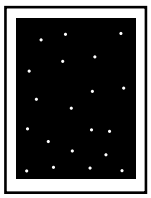
Possible cause	Step	Check	Result	Remedy
Laser unit installation	1	Is the laser unit secured to the frame incorrectly? (Check if there is any play.)	Yes	Secure the unit correctly and tighten the screws.
Laser scanner LD emission failure Scanner motor rotation failure	2	Is the laser diode or the scanner motor defective?	Yes	Replace the laser unit.
Scanner connection failure	3	Is the scanner harness connected properly? (Check if it is coming loose.)	No	Connect the harness correctly.

I-14	Faint print



Possible cause	Step	Check	Result	Remedy
Machine installation	1	Is the machine placed horizontally?	No	Place the machine on a flat surface.
Toner cartridge failure	2	Does the problem happen immediately after replacing the toner cartridge with a new one?	Yes	Remove and carefully shake the toner cartridge horizontally.
Scanner window dirty	3	Is the scanner window dirty?	Yes	Clean the scanner window with a soft dry cloth.
Laser unit failure	4	Is the problem solved by replacing the laser unit?	Yes	Replace the laser unit.

I-15	White spots



User Check

(1) If the problem is not solved after printing a few pages, the drum unit may have glue from label stock on the photosensitive drum surface. Refer to Step 1 in the table below and NOTE in the next page.

(2) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy
Drum unit failure	1	Are the white spot at 94mm intervals?	Yes	1) If toner or glue remains stuck, wipe it off gently with a cotton swab. (Refer to NOTE in the next page.) 2) If the drum surface is scratched, replace the drum unit.
Drum unit failure	2	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.
Toner empty	3	Is the toner in the toner cartridge almost empty?	Yes	Replace the toner cartridge with a new one.
Paper	4	Is the problem solved after changing to specified freshly unpacked paper?	Yes	Damp (wet) paper might be used. Recommend to change freshly unpacked paper.
Environment	5	Does the problem still appear after the machine has warmed up?	Yes	1) Replace the drum unit. 2) Advise the user of the specified print environment.

NOTE:

Clean the drum unit as follows:

(1) Remove the toner cartridge from the drum unit. Place the printing samples in front of the drum unit, and find the exact position of the image defect.

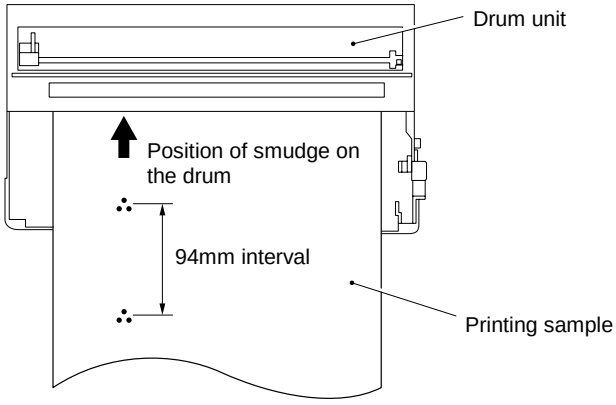


Fig. 6-10

(2) Turn the drum gear by hand while looking at the surface of the photosensitive drum.

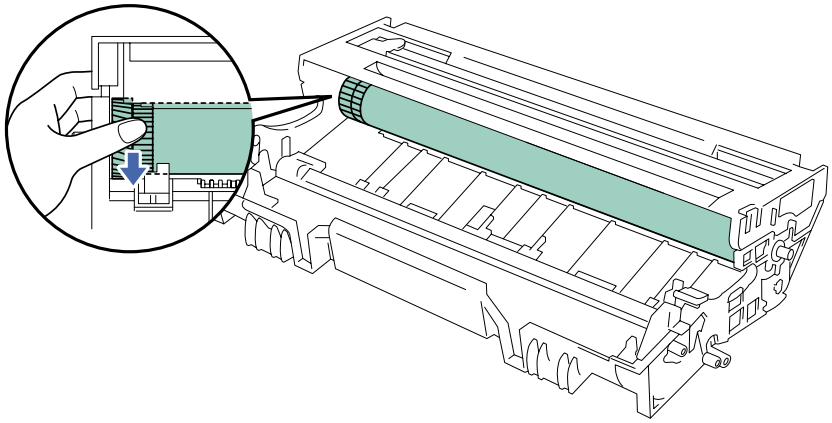


Fig. 6-11

(3) Wipe the surface of the photosensitive drum with a cotton swab until the dust or paper powder on the surface comes off.

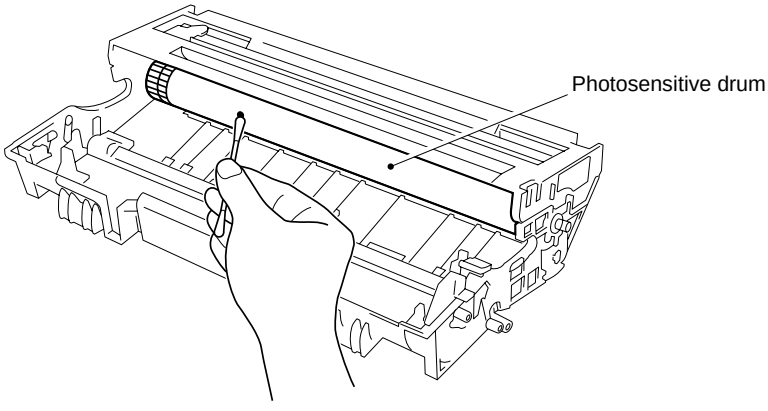


Fig. 6-12

CAUTION:

- *Do not wipe the surface of the photosensitive drum with something sharp. (ball-point pen etc.)*
- *Use cleaning liquid which is a 50-50 mixture of ethyl alcohol and pure water.*

I-16	Black spots

User Check

(1) If the problem is not solved after printing a few pages, the drum unit may have glue from label stock on the photosensitive drum surface. Refer to Step 1 in the table below and NOTE in the previous page.

(2) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Drum unit failure	1	Are the spots at 94mm intervals? (The problem is not solved after printing a few pages.)	Yes	1) If toner or glue remains stuck, wipe it off gently with a cotton swab. (Refer to NOTE in the previous page.) 2) If the photosensitive drum is scratched or deteriorated (exposed), replace the drum unit.	
Drum connection failure	2	Is the contact between the drum unit and machine connected correctly?	No	Clean contact electrode both on the drum unit and in the machine.	(8)
Fixing unit failure	3	Are the spots at 79mm intervals? (The problem is not solved after printing a few pages.)	Yes	1) Check and clean the heat roller with a cloth dampened with alcohol. 2) Replace the fixing unit.	
High-voltage power supply PCB failure	4	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	

I-17	Black band

Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona wire failure	1	Is the wire cleaner at its home position?	No	Return the wire cleaner to its home position.	(2)
Dirt on the corona wire.	2	Is the corona wire dirty?	Yes	1) Clean the corona wire. 2) If the problem still appears after cleaning, replace the drum unit.	(2)

I-18	Gray background

LP

Possible cause	Step	Check	Result	Remedy
Paper	1	Does the paper being used meet the paper specification (weight, etc.)?	No	Recommend to use the specified types of paper.
			Yes	Recommend to change to freshly unpacked paper.
Toner sensor failure (machine side)	2	Is the sign "Toner Empty" displayed on the LCD even after removing the drum unit and toner cartridge? (Be sure to close the cover after removing the drum unit and toner cartridge.)	Yes	Toner sensor failure. Clean the toner sensor and check the toner sensor connection.
Toner cartridge failure	3	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge.
Drum unit failure	4	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.
			No	Replace the high-voltage power supply PCB.

NOTE:

The following cases increase the possibility of this problem.

- *Acid paper is being used.*
- *The drum unit is at the end of its life.*
- *There is dust or paper powder.*

I-19	Hollow print

User Check

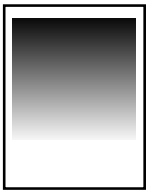
(1) Check the paper used meets the recommended paper specifications.

(2) Select the 'Thick paper mode' in the printer driver, or use thinner paper than you are currently using.

(3) Check the machine's environment, conditions such as high humidity may cause this situation to occur.

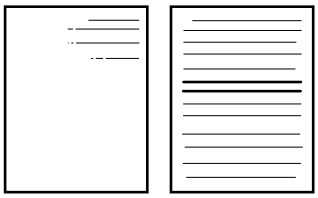
Possible cause	Step	Check	Result	Remedy
Paper	1	Is thick paper of more than 158 g/m^2 being used or extremely rough surface paper?	Yes	Recommend to use the specified types of paper.
			No	Refer and compare with I-15.

I-20	Downward fogging of solid black



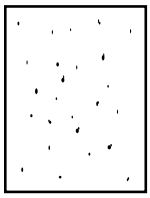
Possible cause	Step	Check	Result	Remedy
Toner cartridge failure	1	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge.
High-voltage power supply PCB failure	2	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.

I-21	Horizontal lines



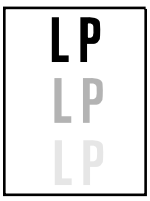
Possible cause	Step	Check	Result	Remedy	Ground contacts
Paper feed roller connection failure	1	Are the paper feed roller shaft and the ground connected correctly?	No	Check the connection between the shaft and the ground. Also check the ground on the back of the paper feed roller.	
Paper tray connection failure	2	Are the ground on the back side of the paper tray connecting correctly?	No	Clean the electrodes.	(7)

I-22	Light rain



Possible cause	Step	Check	Result	Remedy	Ground contact
Drum unit failure	1	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.	
Drum unit connection failure	2	Is the contact between the drum unit and machine connected correctly?	No	Clean contact electrode both on the drum unit and in the machine.	(8)
High-voltage power supply PCB failure	3	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	

I-23	Ghost



User Check

(1) Check the paper used meets the recommended paper specifications. Damp paper, thick media or rough surfaced paper can cause the problem.

(2) Check the machine's environment. High temperature and high humidity conditions can cause the problem.

(3) Check that the appropriate media type is selected in the printer driver.

(4) Try installing a new drum unit.

Possible cause	Step	Check	Result	Remedy
Driver setting	1	Is thin paper such as 64g/m^2 used under the thick paper mode?	Yes	1) Change the current mode to the normal mode from the driver setting. 2) Print 5 or 6 blank pages if this problem occurs.
Drum unit failure	2	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.
High-voltage power supply PCB failure	3	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.

I-24	Toner specks

User Check

(1) Check the paper used meets the recommended paper specifications. A rough surfaced paper may cause the problem.

(2) The toner cartridge may be damaged. Install a new toner cartridge.

(3) The drum unit may be damaged, or may be nearly at the end of life. Install a new drum unit.

8.4 Location of Grounding Contacts

8.4.1 Drum unit

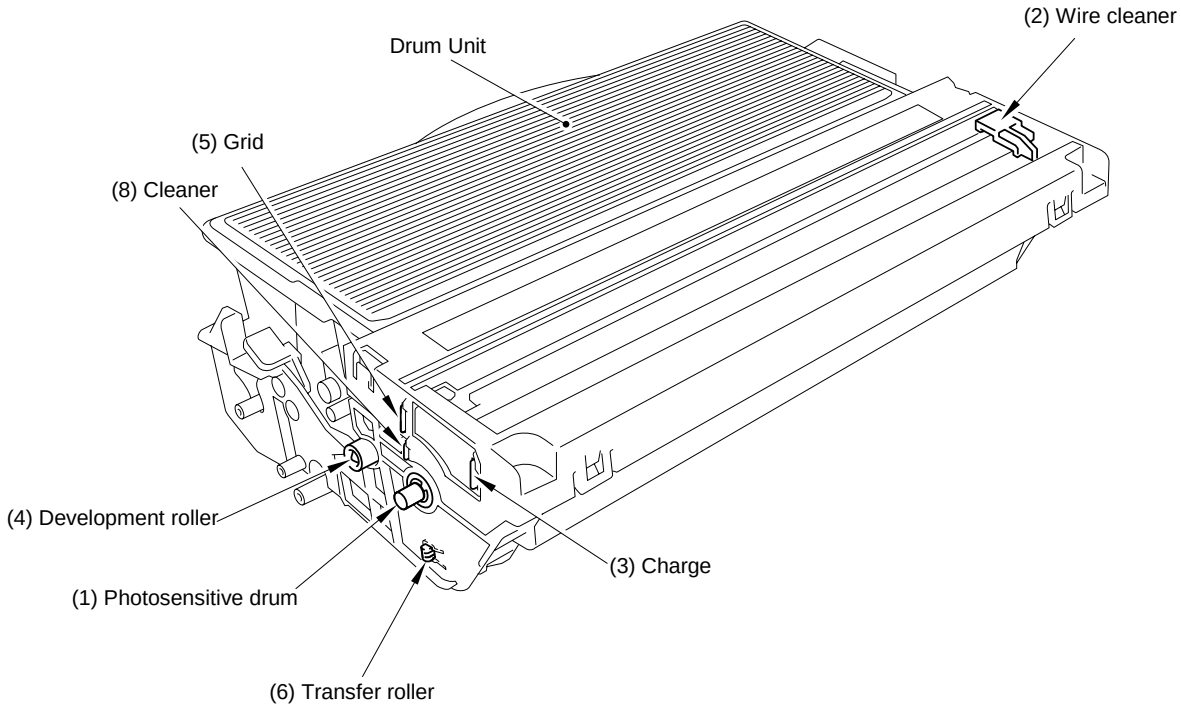


Fig. 6-13

8.4.2 Machine body & Paper tray

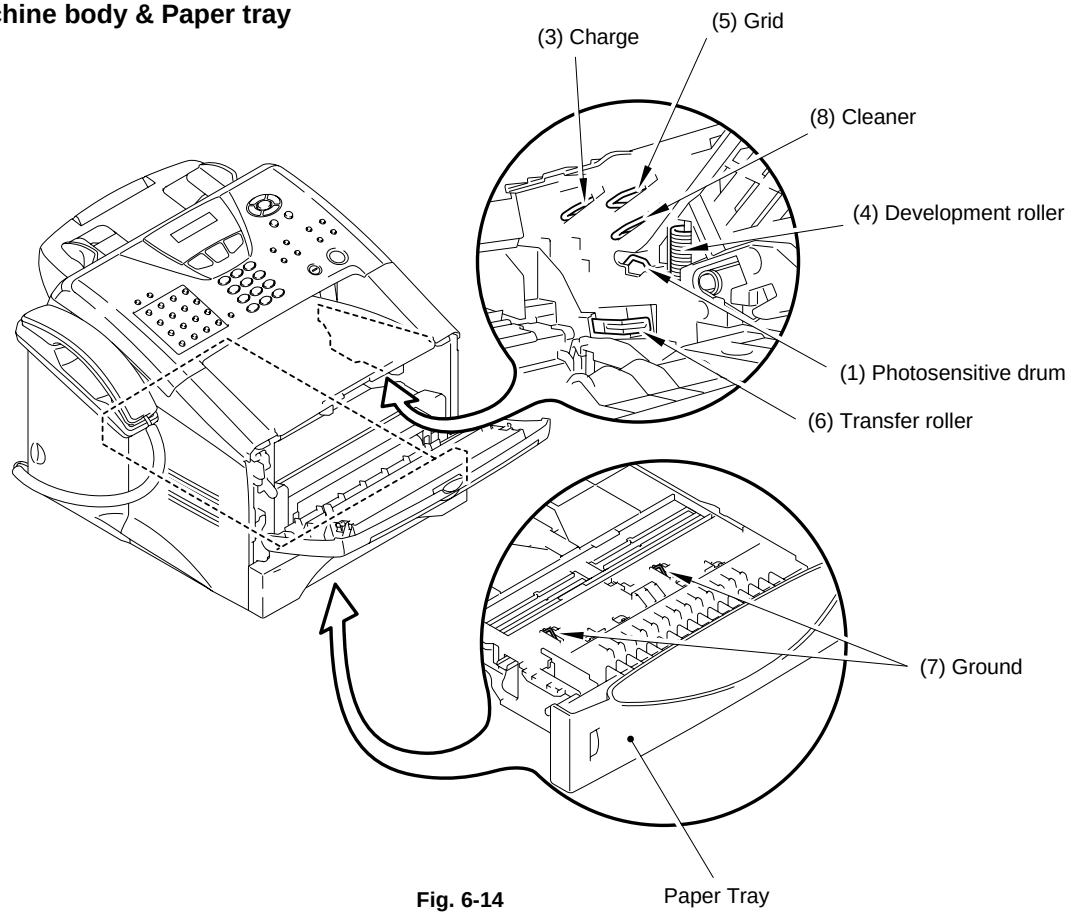


Fig. 6-14

9. INCORRECT PRINTOUT

When the data is not printed correctly as it is seen on the PC screen, follow the procedures below in the event of a specific error.

P-1	The machine prints unexpectedly or it prints garbage.

User Check

(1) Check if the printer cable is not too long. It is recommended to use a parallel cable of less than 2 meters (6.6 feet) in length.

(2) Check that the printer cable is not damaged or broken. Check also that the printer cable is connected to the correct interface connectors of both the machine and PC.

(3) If an interface switching device is used, remove it and connect the computer directly to the machine and try again.

(4) Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct print port is set for the selected printer driver.

(5) Check that the machine is not connected to the same port which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the machine only. Turn off the printer status monitor in the device options tab in the printer driver.

(6) If the print port is set as an ECP port, change it to a normal port.

(7) Try printing the test page referring to 3.4 'Test Pattern 1' in Chapter 7.

(8) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Failure inside the machine	1	Is it possible to print the test page with the method of 3.4 'Test Pattern 1' in Chapter 7?	No	Identify the error type, then refer to the specified section of this chapter.

P-2	Unable to print full pages of a document with the “MEMORY FULL” message.

User Check

(1) **Menu** and **2, 8, 6** and **4** keys are pushed to show maintenance mode, and then 5 and 3 keys are pushed to transmit the data. (See 3.10 Chapter 7)

(2) Reduce the complexity of your document or reduce the machine resolution.

(3) Expand the printer memory by adding a commercially available DIMM.

NOTE:

This problem may appear if the data is too complex.

Possible cause	Step	Check	Result	Remedy
Unable to recognize DIMM	1	Check the memory size in Print Configuration. Is it the default size?	Yes	Expand the memory size by adding DIMM. If the memory is already at the maximum size, it will be impossible to print the data under the machine specifications.
DIMM / main PCB failure	2	Try installing DIMM into another machine, and then check the memory size in Print Settings. Is it possible to print the data?	Yes	Replace the main PCB.
			No	Replace the DIMM.

P-3	Headers or footers are not printed out even though they are viewed on PC screen.

User Check

Most laser machines have a restricted area that cannot be printed on. Usually the first two lines and last two lines of text cannot print (leaving 62 printable lines). Adjust the top and bottom margins in your document to allow for this.

P-4	The machine sometimes prints a couple of characters and then ejects the page.

User Check

(For DOS environment only)

The application machine emulation setting and the machine’s emulation do not match. Check in the application software which machine you have selected to make sure the machine is set up correctly. Remember that the machine emulates widely used machine selections:

HP Laser Jet 6P, Brother BR-Script Level 3, Epson FX-850, IBM Proprinter XL

Try setting the machine into HP emulation and then select the HP LaserJet 6P machine in the application software.

10. NETWORK PROBLEM

If the error related to network occurs, refer to the following sections;

10.1 Installation Problem

If you cannot print over the network, check the following:

(1) Make sure that the machine is powered on, is on-line and ready to print.

Verify that the machine and the configuration are good by printing the machine settings page. If the test fails, check:

a) If the LED is not blinking after connected to the network, then the network firmware settings may be corrupted. Please refer to step (3).

b) In this event, try to restore the factory default settings of the print/fax server. To learn how to reset the print server, set APIPA to off using control panel. Once you have done that, switch the machine off and then on again, and try to print out the configuration page.

(2) If the configuration page is prints but you cannot print documents, try the following.

NOTE:

If none of the following steps are successful, there is almost certainly a hardware or network problem!

a) If you are using TCP/IP:

Try pinging the print/fax server from the host operating system command prompt with the command:

ping ipaddress

Where *ipaddress* is the print/fax server IP address (note that in some instances it can take up to two minutes for the print/fax server to load its IP address after setting the IP address). If a successful response is received, then proceed to the UNIX, TCP/IP Windows® NT/LAN Server, Windows® 98/95/Me Peer to Peer (LPR), Internet Printing or Web Browser troubleshooting section. Otherwise, proceed to step (3), and then go to subsection 10.3 'TCP/IP Troubleshooting'.

b) If you are using Novell system:

Verify that the machine server can be seen on the network. To do this, login as the SUPERVISOR (not as someone with supervisor privileges) or ADMIN (for Netware 4 or later servers), go into PCONSOLE or NWADMIN, select PRINT/FAX SERVER INFORMATION, and select the name of the print/fax server (make sure that you have entered the print/fax server name). If you can see Print/Fax Server Status and Control in the menu, then the Brother print/fax server is visible to the network, proceed to subsection 10.11 'Novell NetWare Troubleshooting'. Otherwise, go to step (3).

c) If you are running AppleTalk for Macintosh:

In case of using Postscript driver make sure that you can see the print/fax server name under the LaserWriter 8 icon in the Chooser. If it is visible, then the connection is good, so proceed to subsection 10.12 'AppleTalk Troubleshooting'. Otherwise, go to step (3).

If you use the Rendevous function, please visit the Brother Solution Center web site on: http://solutions.brother.com

(3) If you cannot make any of the connections in step (2), check the following:

a) Make sure the machine is powered on and on-line.

b) Check the cabling, network connection, and print out a configuration page in the Network STATISTICS information to see if bytes are being transmitted and received.

c) Check to see if there is any LED activity.

The NC-9100h print/fax server has two LEDs on the back panel of the machine. The upper side LED shows Link/Speed status. The lower side LED shows Activity (Receive/Transmit) status.

- No light:
  If the both of the two LEDs are off, then the print/fax server is not connected to the network.
- Link/Speed LED is orange: Fast Ethernet
  The Link/Speed LED will be orange if the print/fax server is connected to a 100BaseTX Fast Ethernet network.
- Link/Speed LED is green: 10BaseT Ethernet
  The Link/Speed LED will blink if the print/fax server is receiving or transmitting data.

(4) If you are using a repeater or hub, make sure that SQE (heartbeat) is turned off at the hub (if applicable). Also, if you have a hub or multi-port repeater, verify that the hub or repeater port is good by trying the print/fax server on a different port or on the other hub or multi-port repeater.

(5) If you have a bridge or router located between the print/fax server and host computer, make sure that the device is set up to allow the print/fax server to send and receive data from the host. For example, a bridge can be set up to only allow certain types of Ethernet addresses to pass through (a process known as filtering); therefore, such a bridge must be configured to allow Brother print/fax server addresses. Likewise, a router can be set up to pass only certain protocols, so be sure that the desired protocol can be passed through to the print/fax server.

(6) If the job exits the queue but does not print, make sure that you are not trying to print a text job to a PostScript printer. If you have a machine that is capable of automatic language switching, make sure that the machine is not forced into PostScript mode.

10.2 Intermittent Problem

If the print/fax server and machine start up OK, but you intermittently have problems printing, check the following:

(1) If you can print small jobs but large graphics jobs are distorted or incomplete, make sure that you have adequate memory in your machine and the latest printer driver installed on your computer. The latest Brother printer drivers can be downloaded from http://solutions.brother.com

(2) Check the individual protocol troubleshooting sections in this chapter for additional causes of intermittent machine problems.

10.3 TCP/IP Troubleshooting

If you are using TCP/IP and cannot print to the print server and you have checked the hardware and network as described in the previous steps, then check the following:

NOTE:

It is always a good idea to try the following in order to eliminate the possibility of setup errors.

- *Turning off the machine and then on again,*
- *Deleting and recreating the print/fax server and creating a new print queue in order to eliminate the possibility of setup errors.*

(1) The problem may be the result of mismatched or duplicate IP address. Verify that the IP address is correctly loaded into the print/fax server (via the configuration page). Make sure that no other nodes on the network have this address (DUPLICATE IP ADDRESS ARE THE BIGGEST CAUSE OF TCP/IP PRINTING PROBLEMS).

(2) Make sure that the TCP/IP protocol of the print server is enabled.

(3) If you used rarp, make sure that you started the rarp daemon on any workstation using the rarpd, rarpd-a, or equivalent command. Verify that the */etc/ethers* file contains the correct Ethernet address and that the print/fax server name matches the name in the */etc/hosts* file.

(4) If you used bootp, make sure that you started the bootp daemon on any UNIX workstation and bootp is enabled (i.e., the "#" is removed from the bootp entry) in the */etc/bootptab* file is correctly configured.

(5) Also verify that host computer and the print/fax server are either on the same subnet, otherwise that the router is properly configured to pass data between the two devices.

10.4 UNIX Troubleshooting

(1) Make sure that the */etc/printcap* file (if applicable) is typed in correctly. In particular, look for missing ":" and "\" characters, because a small error *anywhere* in the file can have major consequences. Also check the */usr/spool* directory to make sure that you have created a valid spool directory.

(2) If you are using a Linux operating system, the X-Window Print tool program that is included with Linux may not properly configure the etc/printcap file for lpd operation, then you might also edit the etc/printcap file and change the following line in the entry for the machine.

```
if
:lp = /dev/null: \

then to
:lp = :\
```

(3) If you are using a Berkeley-based UNIX, make sure that the daemon is started on Berkeley based systems with the command lpc start machine, where machine is the name of the local print queue.

(4) If you are using an AT&T-based UNIX, make sure the machine is enabled (enable machine, where machine is the name of the local print queue).

(5) Make sure that the lpr/lpd remote line machine service are running on the host computer (refer to your host computer documentation for information on how to do this).

(6) If text or PCL jobs are run together, try setting the service (remote machine) with EOT set to string number 2 (<ESC>E). For example:

```
SET SERVICE BRN_xxxxxx_P1 EOT 2
```

(7) If PostScript jobs fail to print or are run together, try setting the service (remote machine) with EOT set to string number 3 (control-D). For example:

SET SERVICE BRN_xxxxxx_P1 EOT 3

(8) If the lines of a text file are staggered, make sure that you have specified a remote printer (rp) name of TEXT in your /etc/printcap file.

(9) If you are using Sun Solaris V2.4 or earlier, there is a bug which causes long print jobs to fail when using a print/fax server. If you are having trouble printing long jobs (over 1MB), add the line mx#0 to your etc/printcap file entry.

(10) If you cannot print from DEC TCP/IP Service for VMS (UCX), make sure that you have version 2.0B or later of this software, because earlier versions will not work with Brother print/fax servers.

10.5 Windows® NT/LAN Server (TCP/IP) Troubleshooting

If you are having trouble printing with Windows® NT or LAN Server, check the following:

(1) Make sure that TCP/IP and TCP/IP print service are installed and running on the Windows® NT system or the LAN Server file server.

(2) If you are using DHCP and you have not created a reservation for the print/fax server, make sure that you enter the NetBIOS name of the print/fax server in the **Name or address of server providing lpd** box.

10.6 Windows® 95/98/Me Peer to Peer Print (LPR) Troubleshooting

If you are having trouble printing on a Windows® 95/98/Me Peer to Peer network (LPR method), check the following:

(1) Make sure that the Brother LPR Port driver is correctly installed and configured according to the Windows® 95/98/Me Peer to Peer chapters.

(2) Try to turn the **Byte Count** on in the **Configure port** area of printer driver properties.

You may find that during the installation of BLP software, the screen that prompts you for a Port name is not displayed. This may happen on some Windows® 95/98/Me computers. Press the ALT and TAB keys to make it appear.

10.7 Windows® 95/98/Me Peer to Peer (HP JetAdmin Compatible Method) Troubleshooting

If you are having trouble printing on a Windows® 95/98/Me Peer to Peer network, check the following (HP JetAdmin compatible method):

(1) If the print/fax server does not show up under JetAdmin on a Windows® 95/98 Peer to Peer network, try removing all of the Windows® 95/98/Me network software from the Network Control panel and then reinstalling them as follows:

- First install the IPX/SPX-Compatible Protocol (or the TCP/IP protocol if you are using a later version of JetAdmin), the Client for Microsoft Networks, and the network adapter card driver.
- Install the Latest HP JetAdmin software.
- Restart the system, and then add the HP JetAdmin service.

10.8 Windows® 95/98/Me/2000/XP/NT 4.0 Peer to Peer Print (NetBIOS) Troubleshooting

If you are having trouble printing on a Windows® 95/98/Me/2000/XP/NT 4.0 (or later) Peer to Peer network (NetBIOS), check the following:

(1) Make sure that the Brother NetBIOS Port driver is securely installed and configured according to the Windows® 95/98/Me/2000/XP/NT 4.0 Peer to Peer (NetBIOS) chapters. You may find that during the installation of the port driver, the screen that prompts you for a Port name is not displayed. This happens on some Windows 95/98/Me/2000/XP/NT 4.0 computers. Press the ALT and TAB keys to make it appear.

(2) Make sure that the print/fax server is configured to be in the same workgroup or domain as the rest of your computers. It may take several minutes for the print/fax server to appear in the network neighborhood.

10.9 Brother Internet Print (TCP/IP) Troubleshooting

(1) The first step in troubleshooting is to make sure that you have a valid E-mail connection on both the sending PC and the receiving print/fax server. Try sending an E-mail message from the PC to a user at the remote site who can receive mail via the POP3 server. If this does not work, there may be an E-mail configuration problem on the PC, on the local E-mail server, or on the remote POP3 server. Double check to make sure that the E-mail parameters that you configured on the PC and on the remote print/fax server match those that are configured on the E-mail servers.

(2) If you can print small files OK but are having problems printing large files, the problem may be in the e-mail system. Some e-mail systems have difficulties printing large files. If the file does not reach its destination intact, then the problem is with the E-mail system.

(3) You can also enable the partial e-mail print facility on your client PC, this will split the e-mail up into fragments which should then not overwhelm your e-mail server. To do this, select the property dialog of the Brother Internet Print Port.

10.10 Windows® 95/98/Me/2000/XP IPP Troubleshooting

Want to use a different Port number other than 631
If you are using Port 631 for IPP printing, you may find that your firewall may not let the print data through. If this is the case, use a different port number (port 80), or configure your Firewall to allow Port 631 data through.

To send a print job using IPP to a machine using Port 80 (the standard HTTP port) enter the following when configuring your Windows® 2000/XP system.
http://ip_address/ipp

"Get More Info" option in Windows® 2000 not working
"Go to Printer's Web site" in Windows® XP not working

If you are using a URL of:
http://ip_address:631 or http://ip_address:631/ipp,
the **Get More Info** option in Windows® 2000 or the **Go to Printer's Web site** option in Windows® XP will not function. If you wish to use the **Get More Info** or the **Go to Printer's Web site** option use the following URL:
http://ip_address
This will then force Windows® 2000/XP to use Port 80 to communicate with the Brother print/fax server.

Windows® 95/98/Me clients not able to get the driver from a Windows® 2000/XP system.

You must be using version 4.0 or later of Internet Explorer and the **Microsoft Internet Print Services** software must be installed on your client computers.

10.11 Novell Netware Troubleshooting

If you cannot print from NetWare and you have checked the hardware and network as described in the previous steps, first verify that the Brother print/fax server is attached to the server queue by going to PCONSOLE, selecting PRINT QUEUE INFORMATION, and then CURRENTLY ATTACHED SERVERS. If the print/fax server does not appear in the list of attached servers, then check the following:

NOTE:

It is always a good idea to try followings in order to eliminate the possibility of setup errors.

- *Turning off the machine and then on again to force to rescan the Netware queue.*
- *Deleting and recreating the print/fax server and creating a new print queue in order to eliminate the possibility of setup errors.*

(1) If you changed the login password, you must change the password in both the Brother print/fax server (using the SET NETWARE PASSWORD command if you are using the BRConfig software) or by using a web browser or the BRAdmin Professional utility and in the file server (using the PCONSOLE Print/Fax Server Information Change Password command).

(2) If you created the print queue using PCONSOLE and instead of BRAdmin Professional utility, make sure that you have enabled at least one NetWare file server using the SET NETWARE SERVER servername ENABLED command.

(3) Have you exceeded your NetWare user limit?

(4) Make sure that the print/fax server name you used in PCONSOLE exactly matches the name that is configured in the print/fax server, and make sure it is defined as a Queue Server for the print queue.

(5) If you are running both 802.3 and Ethernet II frames on different file servers on your network, there is a possibility that the print/fax server may not make a connection to the desired file server. Try forcing the frame type to the desired one using the SET NETWARE FRAME command from the print/fax server remote console or using BRAdmin Professional utility.

(6) If you are using DOS CAPTURE statement and losing portions of your print job, try setting the TIMEOUT parameter in your CAPTURE statement to a higher value (at least 50 seconds for Windows®).

10.12 AppleTalk Troubleshooting

In case of using Postscript driver, if you cannot print from an AppleTalk for Macintosh computer and you have checked the hardware and network as described in the previous steps, then check the following:

(1) Make sure that you are running Phase 2 AppleTalk and that you have selected the correct network interface from the Apple Talk Control Panel on the Macintosh.

(2) Make sure that the AppleTalk protocol of the print/fax server is enabled.

(3) If you have a large network, make sure that you have the Laser Writer V8.xx or equivalent driver, since earlier versions may cause PostScript errors. Also, verify that you get the correct printer information when you select **Printer Info** from the **Setup** button in the Chooser.

(4) Make sure that you have selected the correct Printer Description File (PPD) from the Chooser (otherwise PostScript errors may result).

(5) Verify that you have selected the correct AppleTalk zone. Because the print/fax server gets its zone information from router broadcasts, it may not be in the zone you expect, and will therefore not show up in the Chooser. If this is the case, you may need to force the zone name using BRAdmin Professional utility, a web browser.

10.13 DLC/LLC Troubleshooting

If you are having trouble printing with DLC/LLC, check the following:

(1) Make sure that the DLC/LLC protocol is enabled using either BRAdmin Professional utility, a web browser or TELNET.

(2) Make sure that the MAC address of the Windows® setting is the same as shown in the **print configuration page** printout.

10.14 Web Browser Troubleshooting (TCP/IP)

(1) If you cannot connect to the print/fax server using your web browser it may be worth checking the Proxy Settings of your browser. Look in the Exceptions setting and if necessary, type in the IP address of the print/ax server. This will stop your PC from trying to connect to your ISP or proxy server every time you wish to look at the print/fax server.

(2) Make sure that you are using the proper Web Browser, we recommend Netscape Navigator version 4.0 or later/ Microsoft Internet Explorer version 4.0 or later.

10.15 Internet Fax Troubleshooting

(1) If there is a mail delivery error while sending an Internet Fax, the mail server will send an error message back to the machine and the error message will be printed. If there is an error while receiving mail, an error message is printed (Ex. The message being sent to the machine was not in a TIFF-F format.) All documents transmitted to the machine via e-mail must be in a TIFF-F format.

(2) If an error message is printed while receiving e-mail text from a PC “ATTACHED FILE FORMAT NOT SUPPORTED” the senders mail application may not be set for a “Plain Text” format or “Vcard” the virtual business card feature may be set to ON.

(3) If the receiver’s mail system is not compatible with the MIME format, you cannot transmit a document to the receiver. Depending on the receiver’s server, there are some cases that the error mail will not be sent back.

(4) Message cannot be received in an HTML format. This format is not supported. All message must be received in a TIFF-F Format.

(5) If the size of a documents image data is huge, there is a possibility of unsuccessful transmission if the system administrator has imposed a limit on the maximum size of e-mail and their attachments. The document you are sending should be separated into smaller documents that will be accepted by the mail server. (Ex A 42 page document of the CCITT#1 test chart is approximately 1Mbyte in size).

(6) If you do not receive e-mail, check the Auto Polling setting and Polling frequency.

(7) If you cannot retrieve mail from the mail server, check the setting for the POP3 server and Mailbox name. Check that the POP3 password is entered correctly. This setting is case sensitive.

(8) If Relay Broadcast is not forwarding e-mail to a G3 Fax, check the Relay Broadcast settings and Relay Domain registration. A Relay Domain must be entered for this function to work.

(9) The Relay Broadcasting and Broadcasting features cannot be used at the same time.

(10) Relay Broadcast can support the relay of a document up to a maximum of 48 Fax machines through conventional telephone lines. If sending to more than 48 locations the sender must divide the transmission locations into 48 locations or less for each relay broadcast.

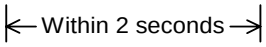
(11) When receiving e-mail messages from the POP3 server, the machine can receive a maximum of 32 mail messages. If there are more than 32 mail messages in the POP3 server, the machine will receive a maximum of 32 mail massages and then receive the remaining after the next polling interval.

(12) The NC-9100h print/fax server requires a portion of the user memory for operation. With the NC-9100h installed the number of fax sheets that can be sent or received will be reduced (by approximately 30 pages of the brother No.1 Test Chart) from the standard machine capacity.

CHAPTER 7 MAINTENANCE MODE

1. ENTRY INTO THE MAINTENANCE MODE

To make the machine enter the maintenance mode, press the **Menu** button, *, **2, 8, 6,** and **4** keys in this order.



The machine beeps for approx. one second and displays "▮▮ MAINTENANCE ▮▮▮" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

To select one of the maintenance-mode functions listed in Section 2, enter the corresponding 2-digit function code with the numerical keys on the control panel. (The details of each maintenance-mode function are described in Section 3.)

NOTE:

- *Pressing the **9** key twice in the initial stage of the maintenance mode makes the machine exit from the maintenance mode, restoring it to the standby state.*
- *Pressing the **Stop/Exit** button after entering only one digit restores the machine to the initial stage of the maintenance mode.*
- *If an invalid function code is entered, the machine resumes the initial stage of the maintenance mode.*

2. LIST OF MAINTENANCE MODE FUNCTIONS

Maintenance mode Functions

Function Code	Function	Reference Subsection (Page)
01	EEPROM Parameter Initialization	3.1 (7-4)
02	————	————
03	————	————
04	————	————
05	Printout of Scanning Compensation Data	3.2 (7-5)
06	————	————
07	————	————
08	ADF* Performance Test	3.3 (7-7)
09	Test Pattern 1	3.4 (7-8)
10	Firmware Switch Setting	3.5.1 (7-9)
11	Printout of Firmware Switch Data	3.5.2 (7-11)
12	Operational Check of LCD	3.6 (7-12)
13	Operational Check of Control Panel PCB	3.7 (7-13)
14	————	————
15	————	————
16	Receiver Volume Adjustment	3.8 (7-14)
32	Sensor Operational Check	3.9 (7-15)
53	Received Data Transfer Function	3.10 (7-17)
54	Fine Adjustment of Scan Start/End Positions	3.11 (7-19)
55	CIS Scanner Area Setting	3.12 (7-20)
67	Paper Feed and Paper Eject Test	3.13 (7-21)
74	EEPROM Customizing	3.14 (7-22)
80	Display of the Equipment's Log Information	3.15 (7-23)
82	Machine Error Code Indication	3.16 (7-25)
87	Output of Transmission Log to the Telephone Line	3.17 (7-25)
91	EEPROM Parameter Initialization	3.1 (7-4)
99	Exit from the Maintenance Mode	——
——	Cancellation of the Memory Security Mode (No applicable to the Japanese version)	3.18 (7-26)

* ADF: Automatic document feeder

< IMPORTANT>

Basically, the maintenance-mode functions listed on the previous page should be accessed by service personnel only. However, you may allow end users to access some of these under the guidance of service personnel (e.g., by telephone).

The user-accessible functions (codes 10, 11, 12, 54, 80, 82, 87 and 91) are shaded in the table given on the previous page. Function code 10 accesses the firmware switches (WSW), each of which has eight selectors. You should not allow end users to access all of those selectors, but you may allow them to access user-accessible selectors which are shaded in the firmware switch tables in Appendix 3.

The service personnel should instruct end users to follow the procedure given below.

(1) Press the **Menu** and **Enlarge/Reduce** button in this order.
NOTE:
The Enlarge/Reduce button does not work when the machine is in the retry mode or the timer function is set.

(2) Press the **0** key.

(3) Enter the desired function code (10, 11, 12, 54, 80, 82, 87, or 91) with the numerical keys. For function code 10, access the desired firmware switch according to the operating procedure described in Appendix 3.

(4) To make the machine return to the standby state, press the **Stop/Exit** button.

MFC8220

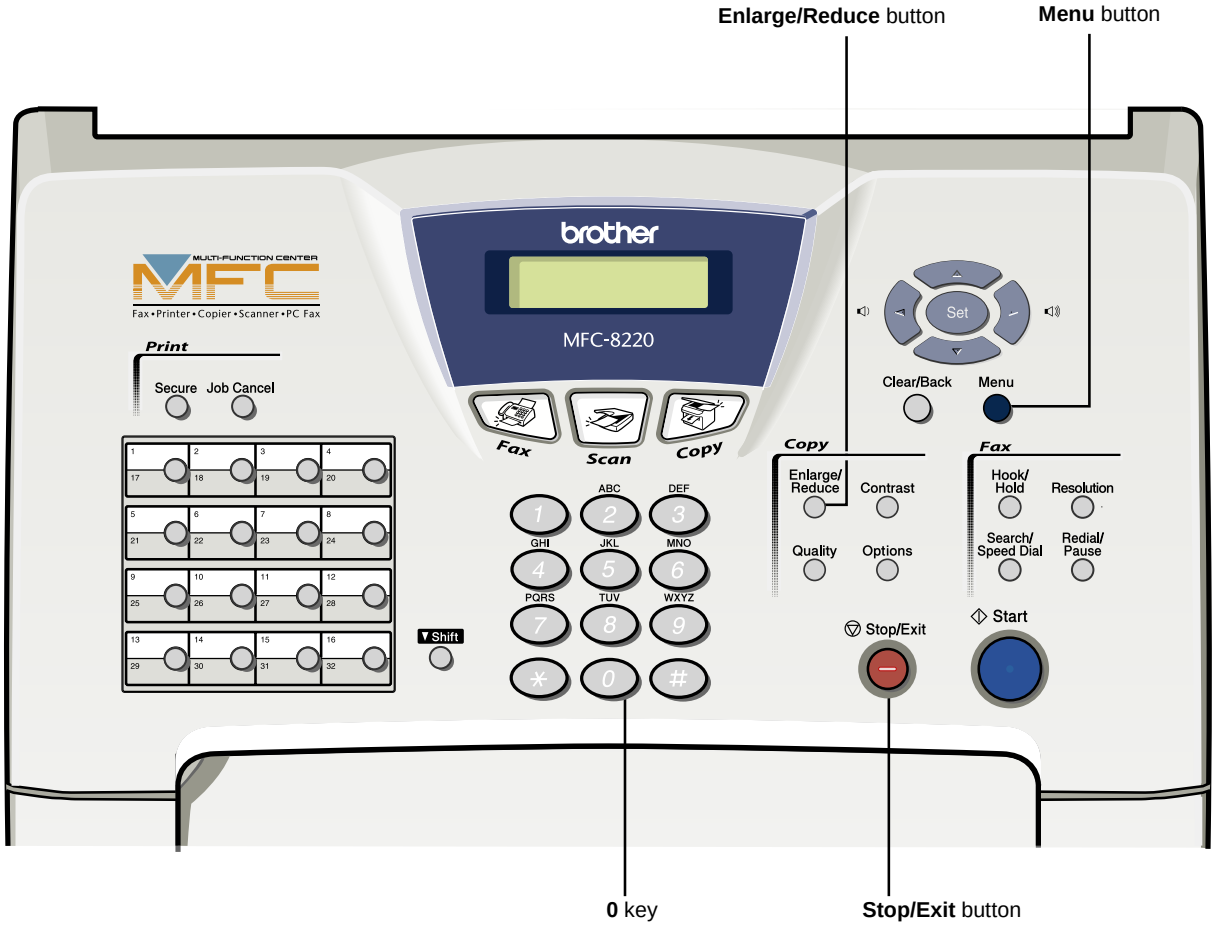


Fig.7-1

3. DETAILED DESCRIPTION OF MAINTENANCE-MODE FUNCTIONS

3.1 EEPROM Parameter Initialization (Maintenance mode 01/91)

< Function >

The machine initializes the parameters, user switches, and firmware switches registered in the EEPROM, to the initial values. Entering the function code 01 initializes all of the EEPROM areas, but entering 91 does not initialize some areas, as listed below.

Data item \ Function code	01	91
Maintenance mode functions	All of these will be initialized	These will be initialized
User switches		
Firmware switches		
Remote activation code		These will not be initialized
Station ID data		These will not be initialized
Outside line number		
Telephone function registration		
One-touch dialing		
Speed dialing		
Group dialing		

NOTE:
If you replace the main PCB with one used for any other machine, carry out this procedure and then customize the EEPROM (maintenance mode function code 74 in Subsection 3.14).

< Operating Procedure >

(1) Press the **0** and **1** keys (or the **9** and **1** keys according to your need) in this order in the initial stage of the maintenance mode.
The "PARAMETER INIT" will appear on the LCD.

(2) Upon completion of parameter initialization, the machine returns to the initial stage of the maintenance mode.

(3) Be sure to turn the machine power off. If you press the **9** key twice to exit from the maintenance mode without turning the power off, then the machine will not fully initialize the EEPROM.

3.2 Printout of Scanning Compensation Data (Maintenance mode 05)

< Function >

The equipment prints out the white and black level data for scanning compensation.

< Operating Procedure >

Do not start this function merely after powering on the equipment but start it after carrying out a sequence of scanning operation. Unless the equipment has carried out any scanning operation, this function cannot print out correct scanning compensation data. This is because at the start of scanning operation, the equipment initializes white and black level data and takes in the scanning compensation reference data.

(1) Press the **0** and **5** keys in this order in the initial stage of the maintenance mode.
The "WHITE LEVEL 1" will appear on the LCD.

(2) The equipment prints out the scanning compensation data list containing the following:

a)	Dark output adjustment value	1Byte
b)	Bright output adjustment value	1Byte
c)	Light source adjustment value	1Byte
d)	Black level MIN data	1Byte
e)	Black level MAX data	1Byte
f)	White level MIN data	1Byte
g)	White level MAX data	1Byte
h)	Background color compensated data	1Byte
i)	Black level data	2448Byte
j)	White level data	2448Byte

(3) Upon completion of recording of the compensation data list, the equipment returns to the initial stage of the maintenance mode.

NOTE:
If any data is abnormal, its code will be printed in inline style, as shown on the next page.

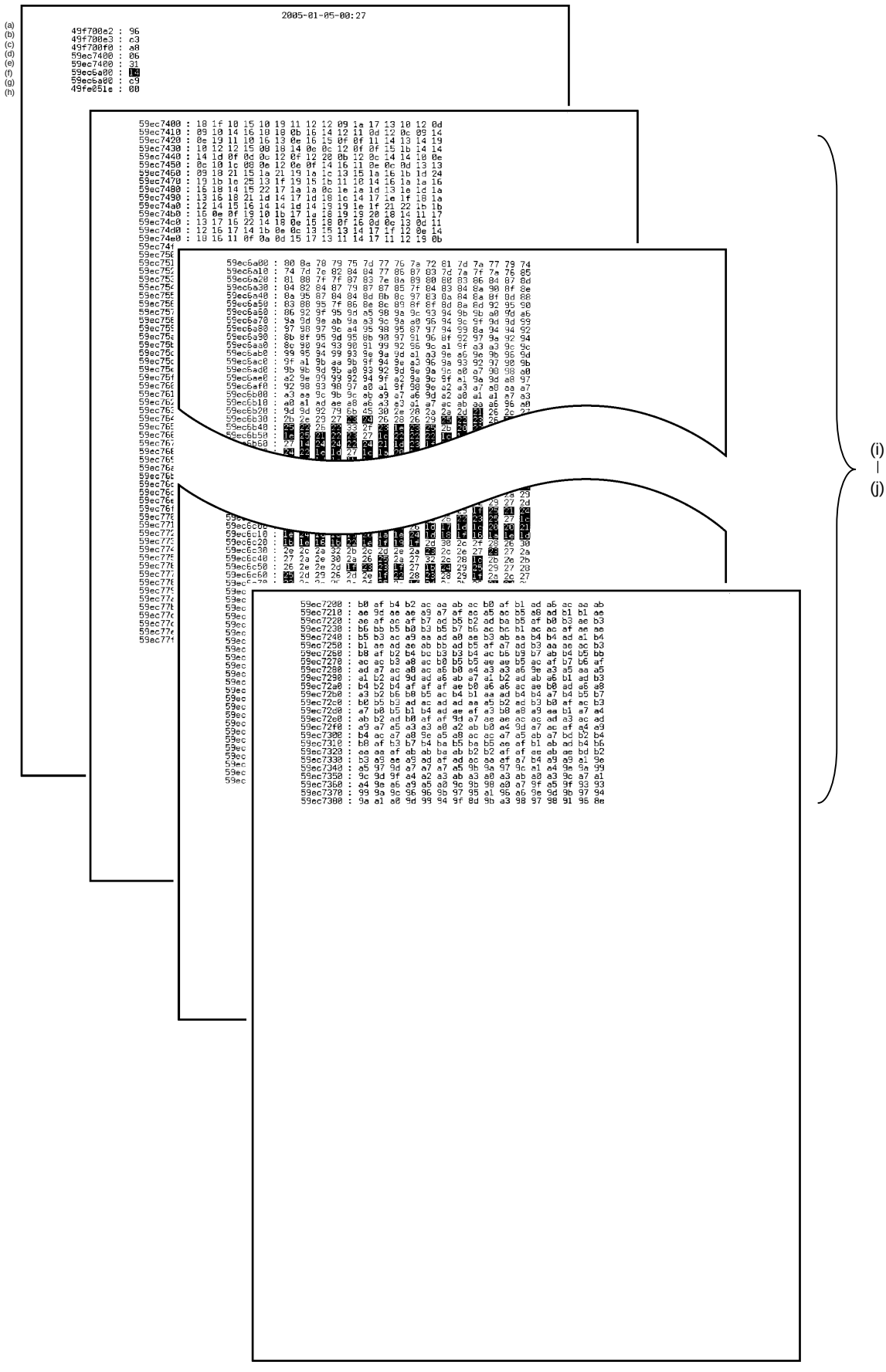


Fig.7-2

3.3 ADF Performance Test (Maintenance mode 08)

< Function >

The machine counts the documents fed by the automatic document feeder (ADF) and displays the count on the LCD for checking the ADF performance.

< Operating Procedure >

(1) Set documents. (Allowable up to the ADF capacity.)
The "DOC. READY" will appear on the LCD.

(2) Press the **0** and **8** keys in this order.
While counting the documents, the machine feeds them in and out, displaying the current count on the LCD as shown below.

Current count (1st page in this example)

(3) To return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** button.

3.4 Test Pattern 1 (Maintenance mode 09)

< Function >

This function, much like the copying function, prints out test pattern 1 to allow the service personnel to check for record data missing or print quality.

< Operating Procedure >

Press the **0** and **9** keys in this order in the initial stage of the maintenance mode.

The figure below shows test pattern 1.

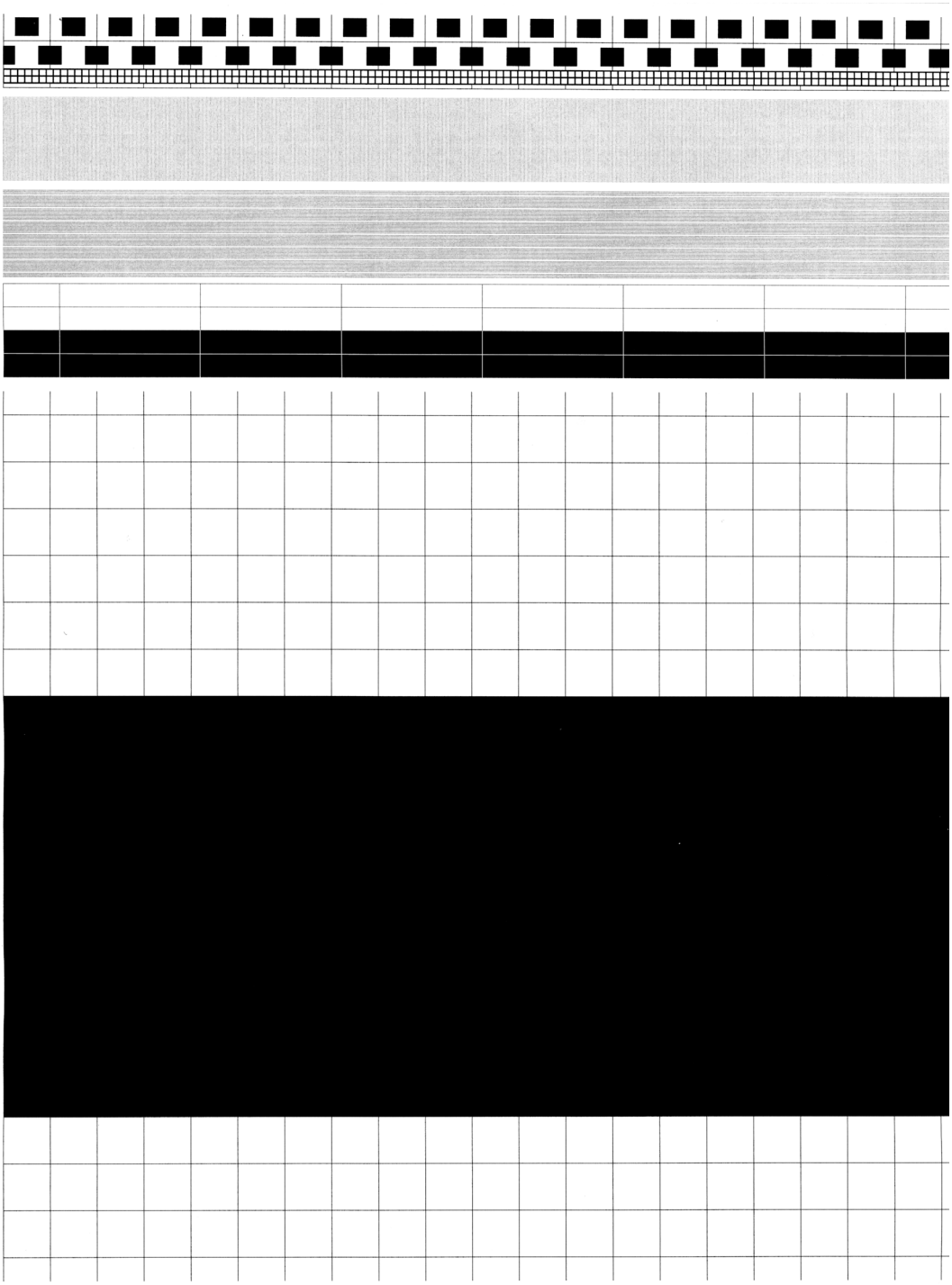


Fig.7-3

3.5 Firmware Switch Setting and Printout

3.5.1 Firmware switch setting (Maintenance mode 10)

< Function >

The machine incorporates the following firmware switch functions which may be activated with the procedures using the control panel keys and buttons.

The firmware switches have been set at the factory in conformity to the communications standards and codes of each country. Do not disturb them unless necessary. Some firmware switches may not be applicable in some versions. The firmware switch data list indicates "Not used." for those inapplicable switches.

Firmware Switches (WSW01 through WSW50)

WSW No.	Function
WSW01	Dial pulse setting
WSW02	Tone signal setting
WSW03	PABX mode setting
WSW04	TRANSFER facility setting
WSW05	1st dial tone and busy tone detection
WSW06	**Pause** button setting and 2nd dial tone detection
WSW07	Dial tone setting 1
WSW08	Dial tone setting 2
WSW09	Protocol definition 1
WSW10	Protocol definition 2
WSW11	Busy tone setting
WSW12	Signal detection condition setting
WSW13	Modem setting
WSW14	AUTO ANS facility setting
WSW15	REDIAL facility setting
WSW16	Function setting 1
WSW17	Function setting 2
WSW18	Function setting 3
WSW19	Transmission speed setting
WSW20	Overseas communications mode setting
WSW21	TAD setting 1
WSW22	ECM setting
WSW23	Communications setting
WSW24	TAD setting 2
WSW25	TAD setting 3
WSW26	Function setting 4
WSW27	Function setting 5
WSW28	Function setting 6
WSW29	Function setting 7
WSW30	Function setting 8
WSW31	Function setting 9
WSW32	Function setting 10
WSW33	Function setting 11
WSW34	Function setting 12

WSW No.	Function
WSW35	Function setting 13
WSW36	Function setting 14
WSW37	Function setting 15
WSW38	Function setting 16
WSW39	Function setting 17
WSW40	Function setting 18
WSW41	Function setting 19
WSW42	Function setting 20
WSW43	Function setting 21
WSW44	Speeding up scanning-1
WSW45	Speeding up scanning-2
WSW46	Monitor of PC ON/OFF state
WSW47	Extending the closing state of the FAX line
WSW48	Function setting 23
WSW49	Function setting 24
WSW50	Not used.

< Operating Procedure >

(1) Press the **1** and **0** keys in this order in the initial stage of the maintenance mode.
The machine displays the "WSW00" on the LCD and becomes ready to accept a firmware switch number.

(2) Enter the desired number from the firmware switch numbers (01 through 50).
The following appears on the LCD:

```
                Selector 1      Selector 8
                    ↓               ↓
WSWXX =         0 0 0 0 0 0 0 0
```

(3) Use the **left arrow** and **right arrow** keys to move the cursor to the selector position to be modified.

(4) Enter a value to be set (0 or 1) using the **0** and **1** keys.

(5) Press the **Set** button. This operation saves the newly entered selector values onto the EEPROM and readies the machine for accepting a firmware switch number.

(6) Repeat steps (2) through (5) until the modification for the desired firmware switches is completed.

(7) Press the **Stop/Exit** button to return the machine to the initial stage of the maintenance mode.

NOTE:

- *To cancel this operation and return the machine to the initial stage of the maintenance mode during the above procedure, press the **Stop/Exit** button.*
- *If there is a pause of more than one minute after a single-digit number is entered for double-digit firmware switch numbers, the machine will automatically return to the initial stage of the maintenance mode.*

< Details of Firmware Switches >

The details of the firmware switches are described in Appendix 3 in which the user-accessible selectors of the firmware switches are shaded.

3.5.2 Printout of firmware switch data (Maintenance mode 11)

< Function >

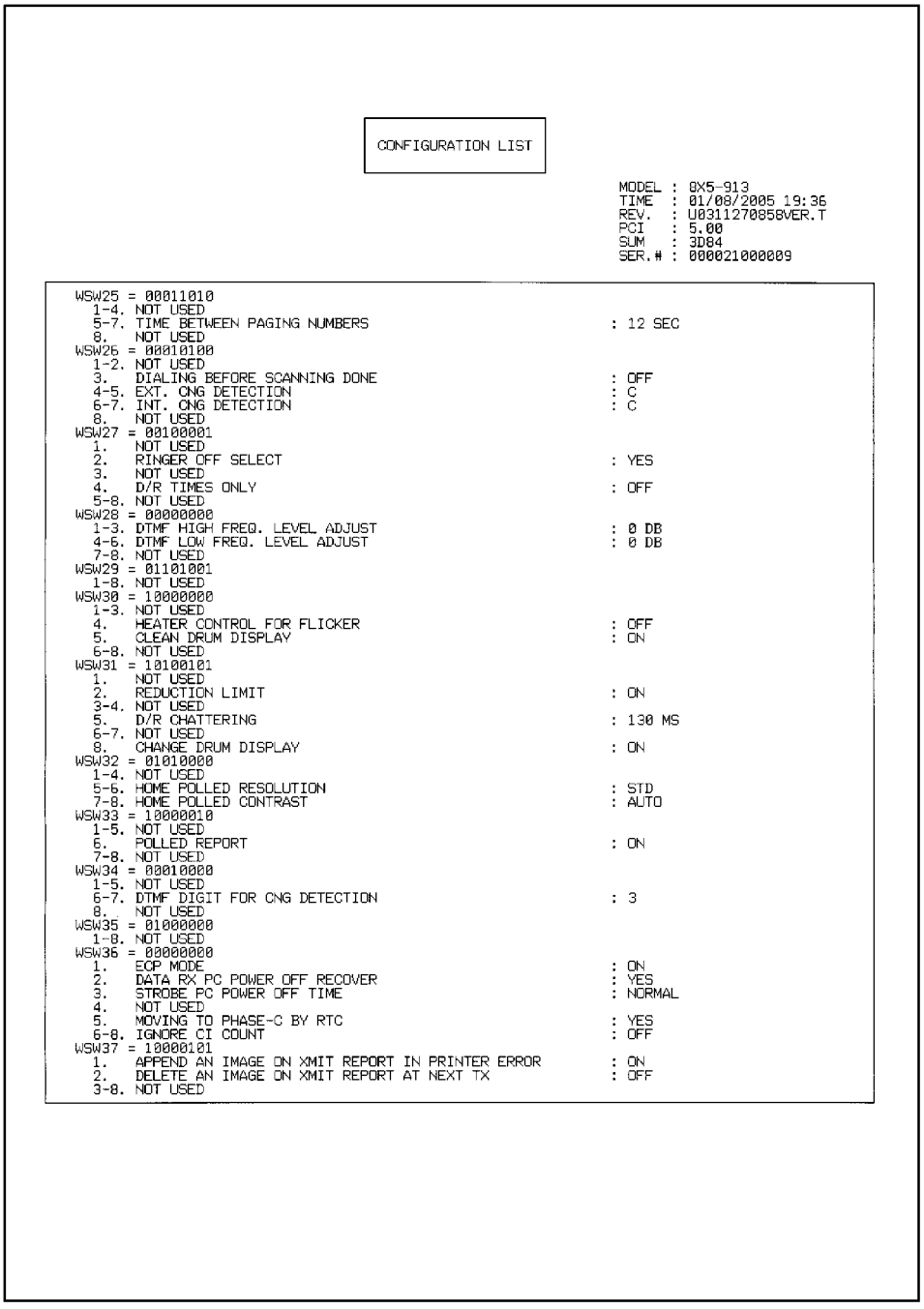
The machine prints out the setting items and contents specified by the firmware switches.

< Operating Procedure >

(1) Press the **1** key twice in the initial stage of the maintenance mode.
The "PRINTING" will appear on the LCD.

(2) The machine prints out the configuration list as shown in the figure below.

(3) Upon completion of printing, the machine returns to the initial stage of the maintenance mode.



CONFIGURATION LIST

MODEL : QX5-913
TIME : 01/08/2005 19:36
REV. : U0311270858VER.T
PCI : 5.00
SUM : 3D84
SER.# : 000021000009

```
WSW25 = 00011010
  1-4. NOT USED
  5-7. TIME BETWEEN PAGING NUMBERS                    : 12 SEC
  8.   NOT USED
WSW26 = 00010100
  1-2. NOT USED
  3.   DIALING BEFORE SCANNING DONE                   : OFF
  4-5. EXT. CNG DETECTION                             : C
  6-7. INT. CNG DETECTION                             : C
  8.   NOT USED
WSW27 = 00100001
  1.   NOT USED
  2.   RINGER OFF SELECT                              : YES
  3.   NOT USED
  4.   D/R TIMES ONLY                                 : OFF
  5-8. NOT USED
WSW28 = 00000000
  1-3. DTMF HIGH FREQ. LEVEL ADJUST                   : 0 DB
  4-6. DTMF LOW FREQ. LEVEL ADJUST                    : 0 DB
  7-8. NOT USED
WSW29 = 01101001
  1-8. NOT USED
WSW30 = 10000000
  1-3. NOT USED
  4.   HEATER CONTROL FOR FLICKER                     : OFF
  5.   CLEAN DRUM DISPLAY                             : ON
  6-8. NOT USED
WSW31 = 10100101
  1.   NOT USED
  2.   REDUCTION LIMIT                                : ON
  3-4. NOT USED
  5.   D/R CHATTERING                                 : 130 MS
  6-7. NOT USED
  8.   CHANGE DRUM DISPLAY                            : ON
WSW32 = 01010000
  1-4. NOT USED
  5-6. HOME POLLED RESOLUTION                         : STD
  7-8. HOME POLLED CONTRAST                           : AUTO
WSW33 = 10000010
  1-5. NOT USED
  6.   POLLED REPORT                                  : ON
  7-8. NOT USED
WSW34 = 00010000
  1-5. NOT USED
  6-7. DTMF DIGIT FOR CNG DETECTION                   : 3
  8.   NOT USED
WSW35 = 01000000
  1-8. NOT USED
WSW36 = 00000000
  1.   ECP MODE                                       : ON
  2.   DATA RX PC POWER OFF RECOVER                   : YES
  3.   STROBE PC POWER OFF TIME                       : NORMAL
  4.   NOT USED
  5.   MOVING TO PHASE-C BY RTC                       : YES
  6-8. IGNORE CI COUNT                                : OFF
WSW37 = 10000101
  1.   APPEND AN IMAGE ON XMIT REPORT IN PRINTER ERROR : ON
  2.   DELETE AN IMAGE ON XMIT REPORT AT NEXT TX      : OFF
  3-8. NOT USED
```

Fig.7-4

3.6 Operation Check of LCD (Maintenance mode 12)

< Function >

This function allows you to check whether the LCD on the control panel works normally.

< Operating Procedure >

(1) Press the **1** and **2** keys in this order in the initial stage of the maintenance mode. The LCD shows.

(2) Press the **Start** button. Each time you press the **Start** button, the LCD cycles through the displays shown at right. The Status lamp also changes from orange, red, to green each time you press the **Start** button.

(3) Press the **Stop/Exit** button in any process of the above display cycle. The machine beeps for one second and returns to the initial stage of the maintenance mode.

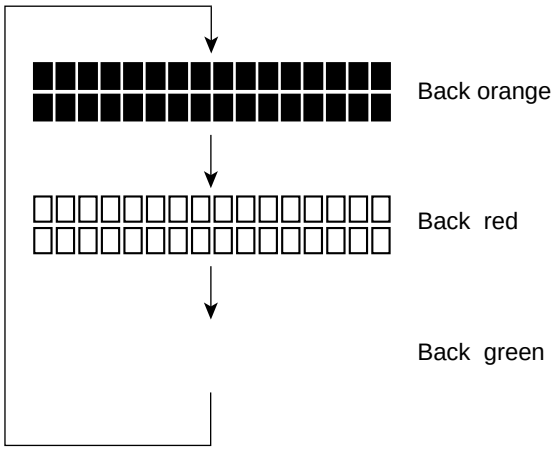


Fig.7-5

3.7 Operational Check of Control Panel PCB (Maintenance mode 13)

< Function >

This function allows you to check the control panel PCB for normal operation.

< Operating Procedure >

(1) Press the **1** and **3** keys in this order in the initial stage of the maintenance mode.
The "00 " will appear on the LCD.

(2) Press the keys and buttons in the order designated in the illustration shown below.
The LCD shows the corresponding number in decimal notation each time a key or button is pressed. Check that the displayed number is correct by referring to the illustration below.
If a key or button is pressed out of order, the machine beeps and displays the "INVALID OPERATE" on the LCD. To return to the status ready to accept key & button entry for operational check, press the **Stop/Exit** button.

(3) After the last number key or button is pressed, the machine beeps for one second and returns to the initial stage of the maintenance mode.
To terminate this operation, press the **Stop/Exit** button. The machine returns to the initial stage of the maintenance mode.

MFC-8220

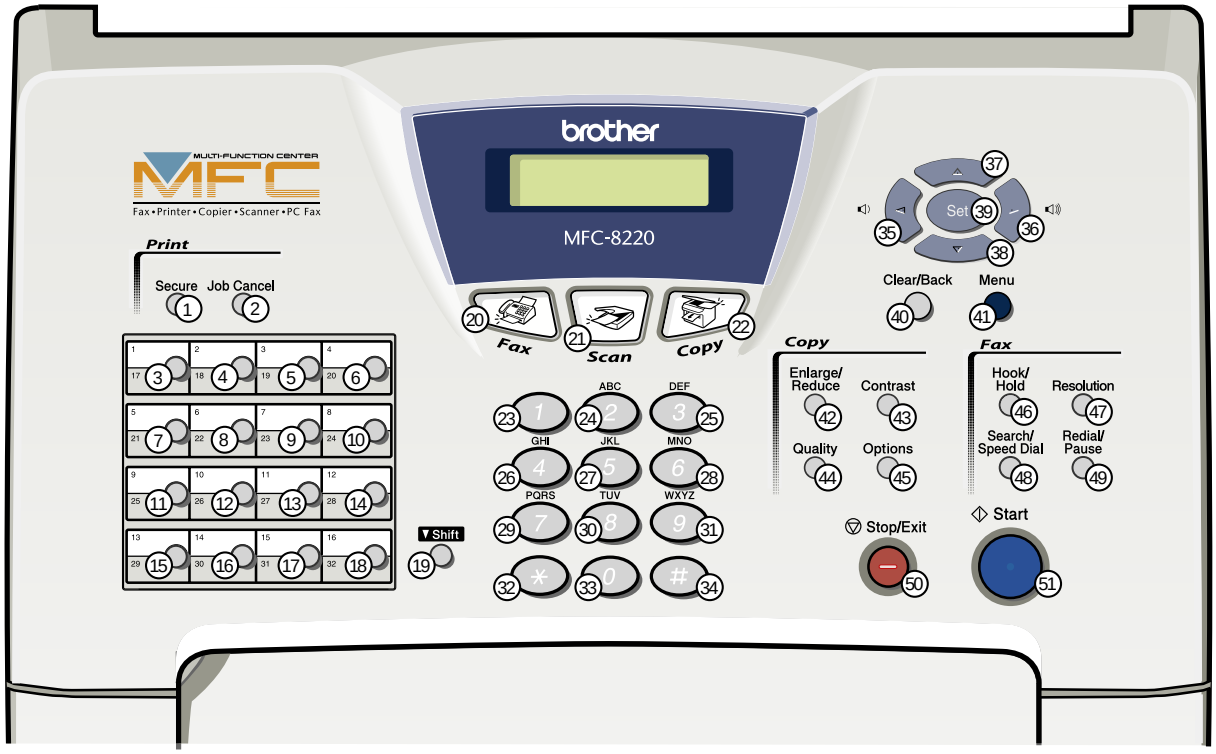


Fig.7-6

3.8 Receiver Volume Adjustment (Maintenance mode 16)

*This is only for display, not for adjustment.

< Function >

When the handset volume is set to ”HIGH”, it is affected by various characteristics of the FET (field effect transistor) on the main PCB, so the fine adjustments described below are required. Meanwhile, the “LOW” setting is fixed and cannot be adjusted.

< Operating Procedure >

(1) Insert the telephone cord to the line terminal (LINE) of the machine and to the telephone jack.

(2) Lift the handset and verify that a dial tone is heard. If the handset volume is not appropriate, go on to the next procedure.

(3) In the initial stage of the maintenance mode, press the **1** key and the **6** key in this order. The present handset volume level (the default setting: “HIGH”) is displayed on the LCD as shown below.

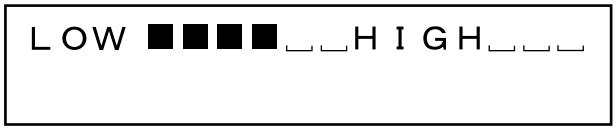


Fig.7-7

(4) If the volume level displayed on the LCD is the one shown below, change the setting to the one (the default setting: “HIGH”) as shown in the above (3) by using the **up arrow** key and the **down arrow** key.

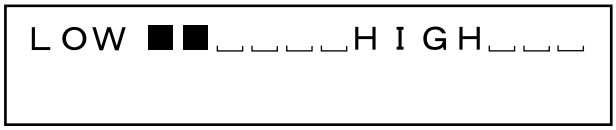


Fig.7-8

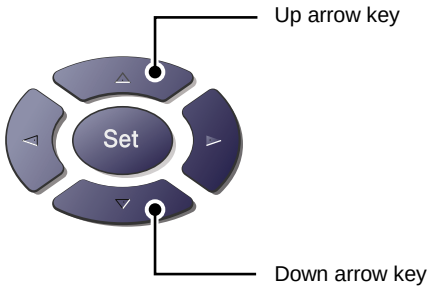


Fig.7-9

(5) Press the **Start** button. The machine enters the handset volume adjustment mode, and the PWM duty ratio is displayed at the right side of the LCD.

(6) As hearing a dial tone from the handset, adjust the handset volume to appropriate volume by using the **1, 3, 4**, and **6** keys.
1 key: Turn up the volume by 10H.
3 key: Increase the volume by 10H.
4 key: Turn up the volume by 1H.
6 key: Increase the volume by 1H.

(7) When the handset volume is adjusted to appropriate volume, press the **Set** button to set the volume setting. Then, "PWM SETTING" is displayed on the LCD, and the display returns to the state as shown in (3).

(8) Press the **Stop/Exit** button, and the machine returns to the initial stage of the maintenance mode.

3.9 Sensor Operational Check (Maintenance mode 32)

< Function >

This function allows you to check whether the 14 sensors--document front sensor, document rear sensor, cover sensor, hook sensor, toner sensor, regist front sensor, regist rear sensor, cassette sensor, tray 1 paper sensor, tray 2 paper sensor, 2nd cassette sensor*, 2nd regist sensor*, fixing sensor and paper eject sensor --operate correctly.

(* These sensors are provided for models supporting a 2nd paper tray.)

< Operating Procedure >

(1) Press the **3** and **2** keys in this order in the initial stage of the maintenance mode. The machine beeps 1100 Hz and 400 Hz tones cyclically through the following volumes for testing the speaker. To stop beeping, press the **Menu** button.

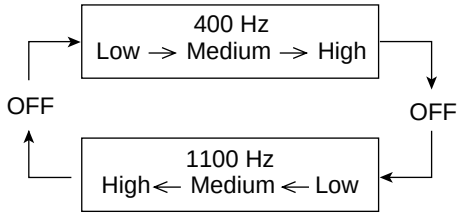


Fig.7-10

If the sensing status are as listed below, the LCD will show the following:

"DFDRCVHK" and "TNMNRSCSP1P2C2R2" "PU PO" (which can be switched by pressing the **Start** button for machines.)

Given below is the relationship between the LCD indication, sensor names and sensor status.

LCD	Sensors	Sensing status
DF	Document front sensor	No document detected.
DR	Document rear sensor	No document detected.
CV	Cover sensor	Front cover closed.
HK	Hook sensor	Off-hook
TN	Toner sensor	Toner detected.
MN	Manual feed sensor (Regist front sensor)	No paper detected.
RS	Regist rear sensor	No paper detected.
CS	Cassette sensor	No paper tray loaded.
P1	Tray 1 paper sensor	Paper detected.
P2	Tray 2 paper sensor	Paper detected.
C2	2nd cassette sensor*	No paper tray loaded.
R2	2nd regist sensor*	No paper detected.
FU	Fixing sensor	No paper detected.
PO	Paper eject sensor	No paper jam.

(* These error indications will always be displayed in models not equipped with a 2nd paper tray.)

(2) Change the detecting conditions to check that the indication on the LCD changes according to the sensor states. For instance, insert paper through the document front (or rear) sensor or the regist sensor(s), open the front cover or the document cover, remove the toner cartridge, jam paper at the paper outlet, insert paper from the manual feeder, and load a paper tray, etc.

(3) Press the **Stop/Exit** button. The machine beeps for one second and return to the initial stage of the maintenance mode.

NOTE:

If you have opened and closed the front cover during the above procedure, you need to open and close the front cover again upon completion of the procedure.

3.10 Received Data Transfer Function (Maintenance mode 53)

< Function >

This function is to transfer received data to another FAX equipment when the machine fails to print out the data because of a recording system failure.

NOTE:

- *The maximum number of files to be transferred at a time is 99. If there are 100 files or more, you need to perform this function more than once.*
- *If both color data and monochrome data exist, monochrome data is transferred first. If the receiving end does not support color, color data cannot be transferred, resulting in an error.*

< Operating Procedure >

(1) Press the **5** and **3** keys in this order in the initial stage of the maintenance mode.
The "FAX TRANSFER" will appear on the LCD.

(2) Press the **1** key to display the number of received documents.
The "1. NO. OF JOBS" will appear.
Press the **Set** button, and then the number of received documents is displayed: e.g., "NO. OF JOBS: 10."

(3) Press the **2** key to transmit an activity report.
The "2. ACTIVITY" will appear.
Press the **3** key to transfer received data. (It is transferred with an activity report attached.)
The "3. DOCUMENTS" will appear. If no received data exists, "NO DOCUMENT" will appear.

(4) Press the **Set** button while the "2. ACTIVITY" or "3. DOCUMENTS" is displayed.
The "ENTER NO. & SET" will appear.

(5) Enter a phone number of the receiving end to which data will be transferred, and then press the **Set** button.

NOTE:
Be sure to enter a phone number directly from the numeric keypad. One-touch dialing functions cannot be used for this function.

The "ACCEPTED" is displayed for approx. 2 sec., and then the machine starts dialing.

The transferred data does not include the transmission terminal ID. Instead, a cover page and an end page as shown on the next page are automatically attached.

Example of the cover page

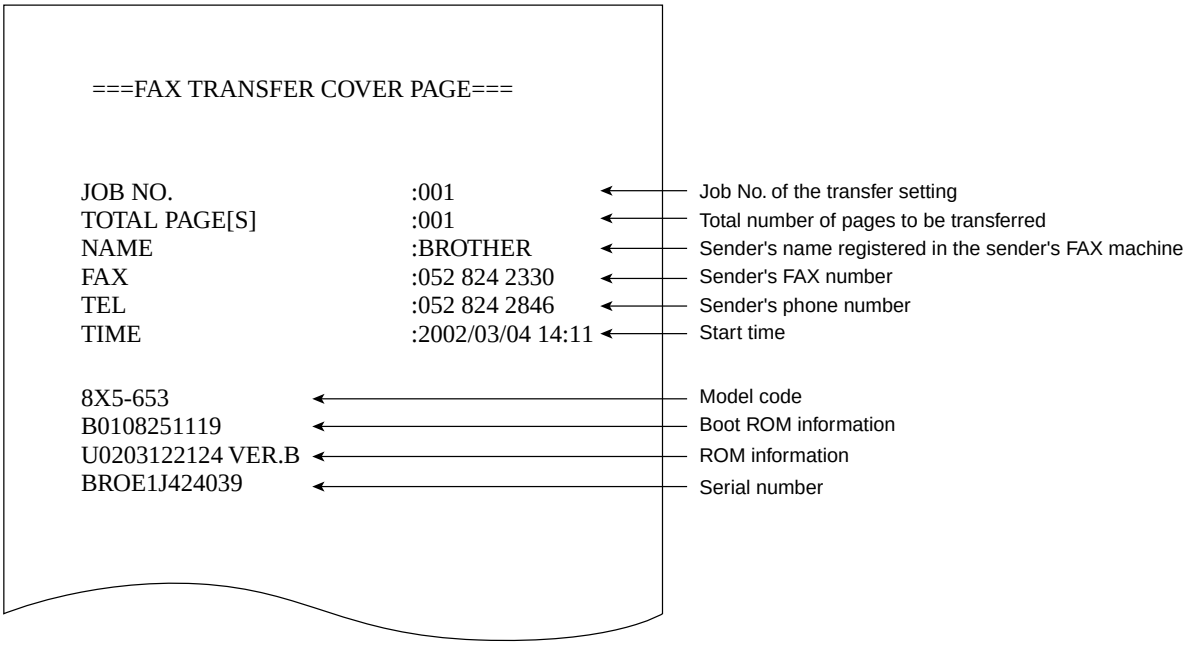


Fig.7-11

Example of the end page

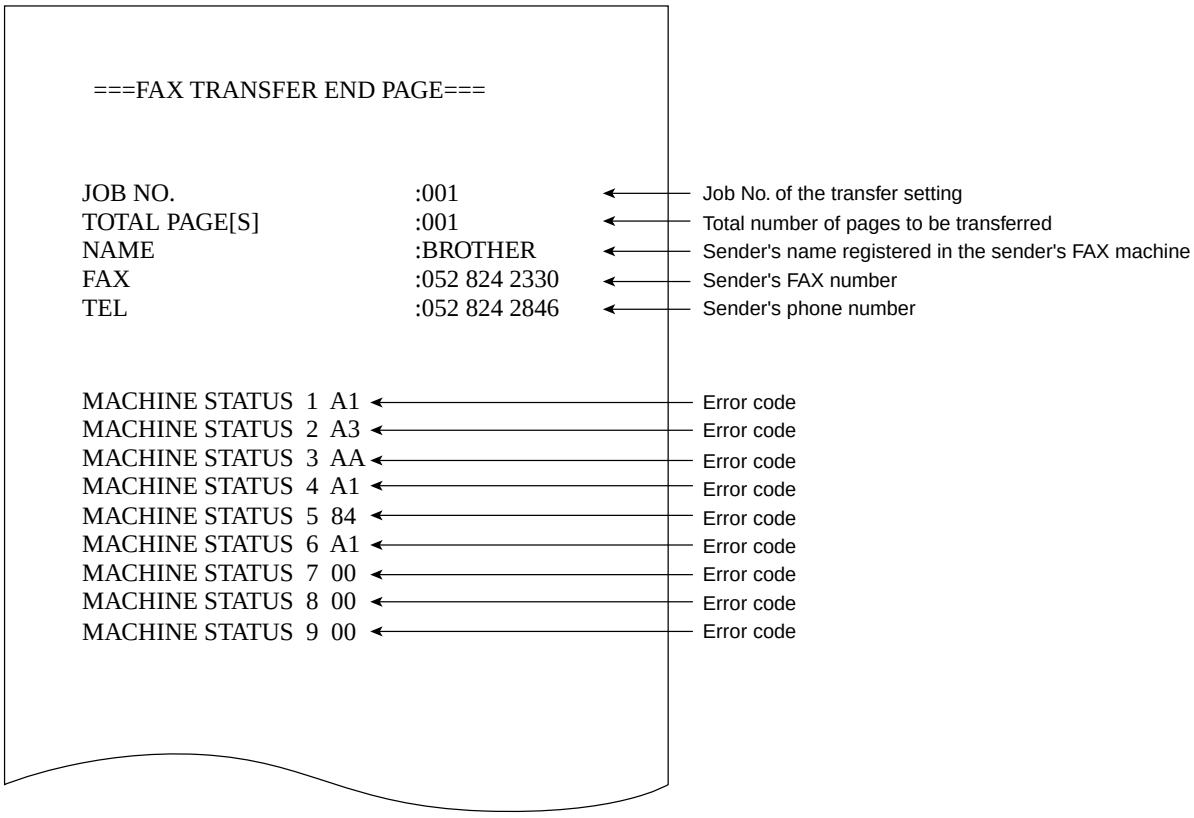


Fig.7-12

3.11 Fine Adjustment of Scan Start/End Positions (Maintenance mode 54)

< Function >

This function is to adjust the scan start/end positions.

< Operating Procedure >

(1) Press the **5** and **4** keys in this order in the initial stage of the maintenance mode.
The “SCAN START ADJ.” will appear on the LCD.

(2) After a while, the present compensation levels of the scan start/end positions are displayed.
Compensation levels can be adjusted in 11 steps from +5 to –5 (mm).

(3) Press the **left arrow** key to increase compensation levels, and the **right arrow** key to lower them.
Press the **Stop/Exit** button, and the machine returns to the initial state of the maintenance mode without adjusting compensation levels.

(4) Press the **Set** button.
The “ACCEPTED” will appear on the LCD. One second later, the machine returns to the initial stage of the maintenance mode.

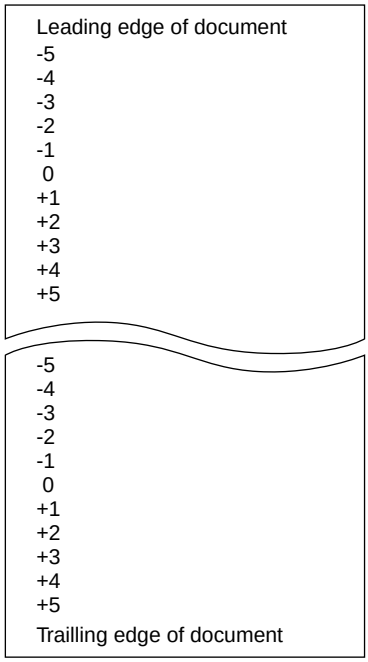


Fig.7-13

NOTE:

The correlation between the scan start/end positions and compensation levels is shown below.

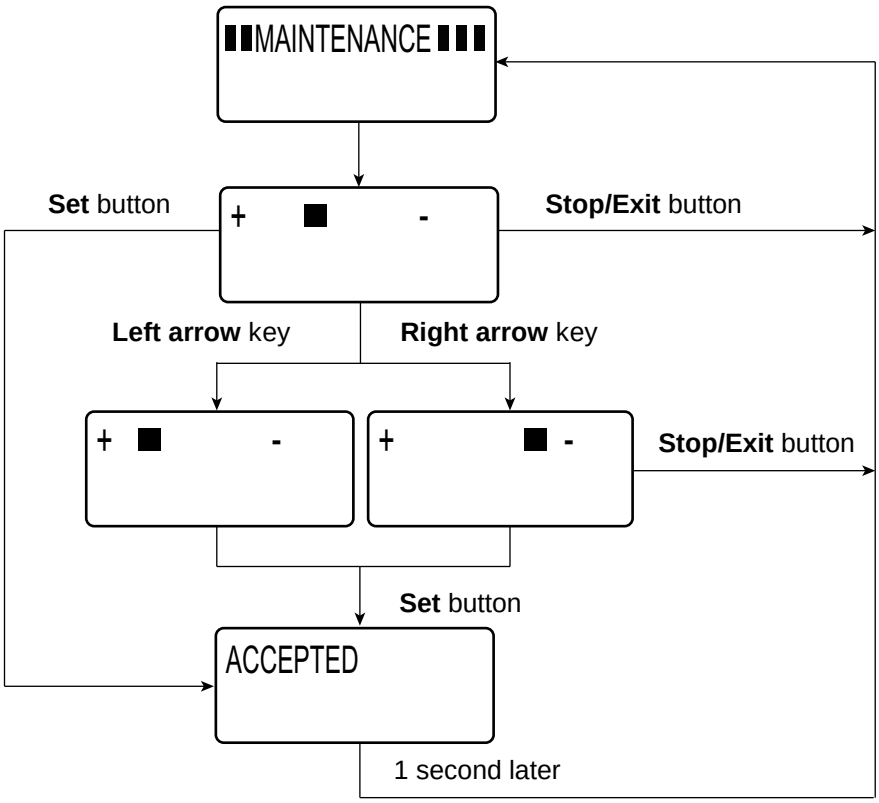


Fig.7-14

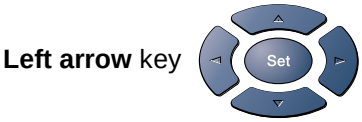


Fig.7-15

3.12 CIS Scanner Area Setting (Maintenance mode 55)

< Function >

This function is to set the scanning area of the CIS scanner of this machine and store the setting value in the EEPROM.

< Operating Procedure >

(1) In the initial stage of the maintenance mode, press the **5** key twice, and "SCANNER AREA SET" is displayed on the LCD display.

(2) Store the magnification correction setting value in the EEPROM, and the machine returns to the initial stage of the maintenance mode.

3.13 Paper Feed and Paper Eject Test (Maintenance mode 67)

< Function >

This function is to verify if paper is properly fed from a paper tray and properly ejected to a paper eject tray. Please make use of it for confirmation after repair service is done.

< Operating Procedure >

(1) Press the **6** and **7** keys in this order, and "SELECT: TRAY 1" is displayed on the LCD.

(2) Press the **up arrow** key or the **down arrow** key, and the display is changed to "SELECT: TRAY2." Select the tray to be checked using the **up arrow** key or the **down arrow** key.

(3) Press the **SET** button, and "PAPER FEED TEST" is displayed on the LCD, then paper feed and paper eject test starts. Grids as shown in the next page are printed on paper.

(4) Press the **Stop/Exit** button, and the paper feed and paper eject test is cancelled, then the machine returns to the initial stage of the maintenance mode.

Hint:

- *The paper feed and paper eject test continues until paper loaded in the tray runs out unless the **STOP/Exit** button is pressed.*
- *When paper in the tray runs out, "Check Paper" and "Reload Paper" are displayed. When paper is loaded in the tray, the machine returns to the initial stage of the maintenance mode.*
- *When the front cover is opened during the paper feed and paper eject test, error sound beeps, and " Cover Open" and "Pls Close Cover" are displayed. When the front cover is closed, the machine returns to the initial stage of the maintenance mode.*

3.14 EEPROM Customizing (Maintenance mode 74)

< Function >

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings. The customizing codes list is given in Appendix 1.

NOTE:

If you replace the main PCB, be sure to carry out this procedure.

< Operating Procedure >

(1) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.
The current customizing code (e.g., 9001 in the case of MFC8220 U.S.A. version) appears.

(2) Enter the desired customizing code (e.g., 9001 in the case of MFC8220 U.S.A. version). The newly entered code appears.
NOTE:
The machine does not work properly when an incorrect code is entered.

(3) Press the **Start** button.
The machine saves the setting and appears the “PARAMETER INIT” on the LCD.
The machine returns to the initial stage of the maintenance mode.
If you press the **Stop/Exit** button or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

3.15 Display of the Equipment's Log Information (Maintenance mode 80)

< Function >

The equipment may display its log information on the LCD.

< Operating Procedure >

(1) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode.
The USB serial number appears on the LCD.

(2) Press the **Start** button. Each time the **Start** button is pressed, one of the following log information items appears on the LCD in the order given below.

1) Jam count, indicating how many times a paper jam has been occurred
2) Page count, indicating how many pages the photosensitive drum has been printed
3) Total page count, indicating how many pages the equipment has been printed since produced
4) Drum count, indicating how many times the photosensitive drum has been rotated
5) Drum change count, indicating how many times drum replacement has been made
6) Toner change count, indicating how many times toner replacement has been made
7) Copy page count, indicating how many copies have been made
8) PC print page count, indicating how many pages the equipment has been printed as an output device of the connected PC
9) FAX page count, indicating how many received FAX pages have been printed
10) Error code of the most recent machine error *1
11) Error code of the most recent communications error *2
12) ADF jam count, indicating how many times a document jam has been occurred
13) ADF page count, indicating how many documents have been fed

(3) To stop this operation and return to the equipment to the initial stage of the maintenance mode, press the **Stop/Exit** button.

*1 When you press the **Set** button while the MACHINE ERR error code is displayed, the last error code is displayed. Each time the **Set** button is pressed, up to the ten error codes are displayed one by one in reverse order.

*2 When you press the **Set** button while the COMEER1 error is displayed, the last error, the previous error, and the second previous error are displayed in turn. The indication changes from COMEER1, COMEER2, to COMEER3.

USB:	USB Serial No.
T1_JAM:	Number of jams that occurred at the tray 1
T2_JAM	Number of jams that occurred at the tray 2
IN_JAM	Number of jams that occurred at the feeding
RE_JAM	Number of jams that occurred at the ejecting
TOTAL PG	Total number of pages printed
DRUM_PG	Number of pages printed by a drum
TNER_PG	Number of pages printed by a toner cartridge
T1_PAGE	Number of pages picked up from the tray 1
T2_PAGE	Number of pages picked up from the tray 2
A4/LTR	Number of A4/Letter size sheets picked up
LG/A4L	Number of Legal/A4-Long size sheets picked up
B5/EXE	Number of B5/Executive size sheets picked up
ENVLOP	Number of envelopes picked up
OTHER	Number of other-size sheets picked up
DRUM:	Drum counter
COVERAGE:	Average black coverage
DRUM_CH	Number of times the drum has been replaced
DATE	Last date when the drum was replaced
TNER_CH	Number of times the toner cartridge has been replaced
DATE	Last date when the toner cartridge was replaced
COPY	Number of copies made
PC PRINT	Number of PC prints made
FAX	Number of FAX outputs made
MACHINE ERR	Last machine error code
COMERR1	Last communication error code
ADF_JAM	Number of document jams that occurred at the ADF
AD_PAGE	Number of scanned pages from the ADF

3.16 Machine Error Code Indication (Maintenance mode 82)

< Function >

This function displays an error code of the last error on the LCD.

< Operating Procedure >

(1) Press the **8** and **2** keys in this order in the initial stage of the maintenance mode.
The LCD shows the "MACHINE ERROR X X."

(2) Press the **Stop/Exit** button. Return to the initial stage of the maintenance mode.

3.17 Output of Transmission Log to the Telephone Line (Maintenance mode 87)

< Function >

This function outputs the transmission log (that the machine has stored about the latest transmission) to the telephone line. It allows the service personnel to receive the transmission log of the user's machine at a remote location and use it for analyzing problems arising in the user's machine.

< Operating Procedure >

(1) If the user's machine has a transmission-related problem, call the user's machine at a remote location from your machine.

(2) If the line is connected, have the user perform the following:
1) Hook up to the external phone.
2) Press the **Menu** button, **Enlarge/Reduce** button, and **0** keys in this order.
3) Press the **8** and **7** keys.
The above operation makes the user's machine send CNG to your machine for sending the transmission log.

(3) If you hear the CNG sent from the user's machine, press the **Start** button of your machine.
Your machine will start to receive the transmission log from the user's machine.

3.18 Cancellation of the Memory Security Mode (Not applicable to the Japanese version)

< Function >

This procedure can cancel the memory security mode. Use this procedure if the user forgets his/her password entered when setting the memory security mode so as not to exit from the memory security mode.

NOTE:

Carrying out this procedure will lose passwords previously entered but retain FAX messages received in the memory security mode.

< Operating Procedure >

(1) When the SECURE MODE is displayed on the LCD, hold down the **Menu** button and press the **#** key. Within two seconds, start to press the **2**, **7**, **9**, **0**, and **0** keys.

The memory security mode will be canceled and the machine returns to the calendar clock screen.

APPENDIX 1 EEPROM CUSTOMIZING CODES

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings.

< Operating Procedure >

(1) To make the machine enter the maintenance mode, press the **Menu** button, *, **2, 8, 6,** and **4** keys in this order.

←Within 2 seconds→

The machine beeps for approx. one second and displays "▮▮ MAINTENANCE ▮▮▮" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

(2) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.
The current customizing code (e.g., 9001 in the case of MFC8220 U.S.A. version) appears.

(3) Enter the desired customizing code (e.g., 9001 in the case of MFC8220 U.S.A. version). The newly entered code appears.
NOTE:
The machine does not work properly when an incorrect code is entered.

(4) Press the **Start** button.
The machine saves the setting and returns to the initial stage of the maintenance mode.
If you press the **Stop/Exit** button or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

< EEPROM Customizing Codes List >

Versions	Models
	MFC-8220
U.S.A.	9001
Canada	0002
Germany	0003
United Kingdom	0004
France	0005
Belgium	0008
New Zealand	0009
Switzerland	0010
Ireland	0004
Denmark	0013
Austria	0003
Spain	0015
Italy	0016
Portugal	0018
Pan/Nordic (Norway, Finland, Sweden)	0057
General	0050

APPENDIX 2 INSTALLING THE UPDATE DATA

1. INSTALLING THE UPDATE DATA TO THE MACHINE

If you want to update the current program stored in the flash ROM of the main PCB to the newer version or after you replace the main PCB, install the update program onto the flash ROM.

The program installation requires a PC/AT-compatible computer (which is capable of running MS-DOS or its compatible OS).

1.1 Connecting the Machine to Your PC

(1) Make sure that your PC is turned off.

(2) Make sure that the power cord of the machine is unplugged from a wall socket or other power source.

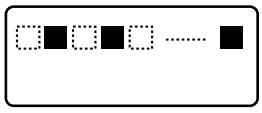
(3) Connect the parallel interface cable to the parallel port on the back of the machine and secure it with the lock wires.

(4) Connect the other end of the interface cable to the printer port of your PC and secure it with the two screws.

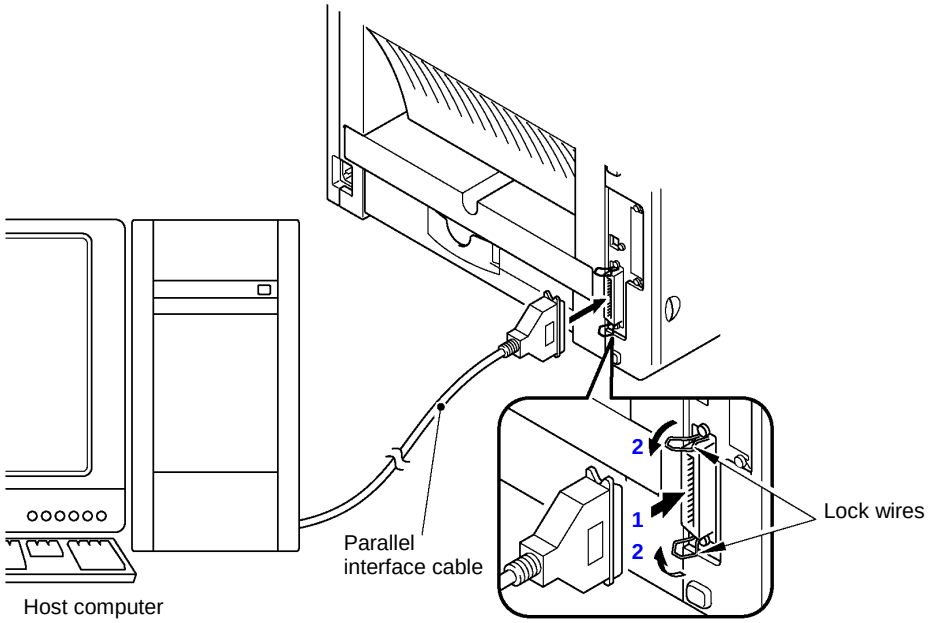
1.2 Setting up the Machine and Your PC

(1) Plug the power cord of the machine into a wall socket, and turn on the power switch while pressing the **5** key on the machine's control panel.

(2) Check to see that the following pattern displays on the LCD. If it does not display, go back to step (2) above.



(3) Turn on your PC.



1.3 Installing the Update Data onto the Flash ROM of the Machine

< On a PC running Windows 95 >

(1) Copy the update data and transfer utility onto the desired same directory of the hard disk. e.g., C:\UPDATE

(2) Click the **Start** button, point to Programs, and then click MS-DOS Prompt to open an MS-DOS window.

(3) Type the drive letter where the update data and transfer utility are located. In the above example, type C:\ from the command line and press the **Enter** key.

Then type CD UPDATE and press the **Enter** key.

(4) To start the transfer utility transmitting the update data to the flash ROM of the machine, type the following:

ICEN *filename* /b

Where *filename* is an update data file, e.g., 8220xxxx.dat.
Then press the **Enter** key.
During downloading, the machine beeps *intermittently*.
Upon completion of the downloading, the machine beeps *continuously*.

NOTE:

If the machine cannot return to the standby state after completion of downloading, turn the power off and on.

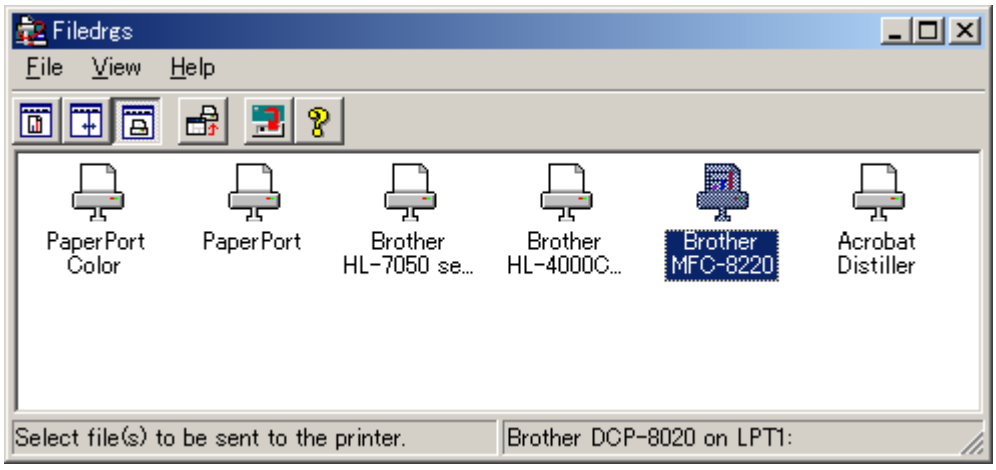
< On a PC running Windows 98/Me/2000 >

(1) Install the printer driver for the parallel port to your PC. (Once installed, no more printer driver is required for your PC.)

(2) Copy the update data onto the desired directory of the hard disk.
e.g., C:\UPDATE

(3) Copy the transfer utility “Filedg32.exe” onto the desired directory of the hard disk.

(4) Run “Filedg32.exe”.
The Filedrgs window will appear as shown below.



(5) Drag and drop the update data onto the icon of the model being used in the Filedrgs windows.

During downloading, the machine beeps *intermittently*.
Upon completion of the downloading, the machine beeps *continuously*.

NOTE:

If the machine cannot return to the standby state after completion of downloading, turn the power off and on.

2. SETTING ID CODES TO MACHINES

Brother driver machines are assigned unique ID codes (character strings) at the factory. If you replace the main PCB of the machine, the machine will lose its assigned ID code so that it will not be identified by the connected PC*.

You need to assign a unique ID code (character string) to the machine according to the procedure given here. For models covered by this manual, set serial numbers given to individual machines as ID codes.

(*ID codes are essential when more than one machine is connected to a single PC via USB.)

Please check the printer driver of MFC-8220 is installed in a host computer before working. When not installed. Please install a printer driver in a host computer before working.

2.1 Connecting the Machine to Your PC

(See the illustration on page A-2.)

(1) Make sure that your PC is turned off.

(2) Make sure that the power cord of the machine is unplugged from a wall socket or other power source.

(3) Connect the parallel interface cable to the parallel port on the back of the machine and secure it with the lock wires.

(4) Connect the other end of the interface cable to the printer port of your PC and secure it with the two screws.

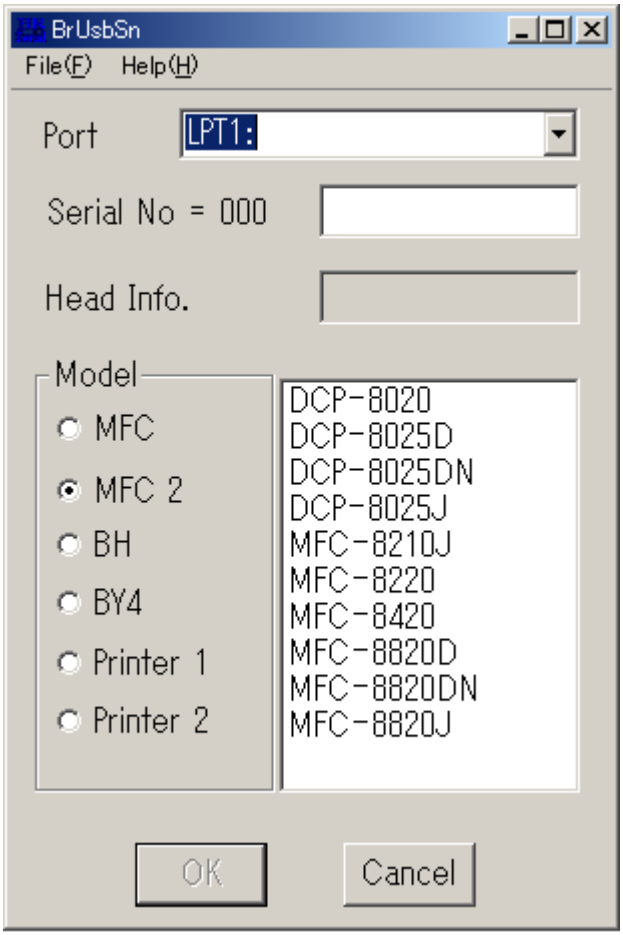
2.2 Setting Up the Machine and Your PC

(1) To make the machine enter the maintenance mode, press the **Menu** button,
*, **2, 8, 6,** and **4** keys in this order.
←Within 2 seconds→

(2) Turn on your PC.

2.3 Running the Setup Utility

(1) On your PC, run the ID/head property setup utility (BRUSBSN.EXE). The following window will appear.



(2) On the **Model** menu, click **MFC 2**.

In **Port**, make sure that the HFC/DCP ports connected are shown.

When not select, please click **down arrow** key and select the USB port of MFC-8220.

In the **Serial No = 000** box, type the 9-digit serial number (e.g., G01012345) printed on the nameplate labeled to the back of the machine as an ID code. Then press the **OK** button.

The setup utility will transmit the ID code data from your PC to the machine and then it will terminate.

The machine will automatically return to the standby mode.

(3) To check whether the entered character string (ID code) is correct, make the machine then press the **8** key and **0** key in this order (refer to CHAPTER 7, Subsection 3.15).

The USB serial number appears on the LCD.

(4) Check that the character string entered in step (2) is appears on “XXXXXXXXX.”

If it is OK, press the **Stop/Exit** button and press the **9** key twice to exit from the maintenance mode.

If something other than that is printed in XXXXXXXXX, check the connection between the PC and machine and go back to step (1).

APPENDIX 3 FIRMWARE SWITCHS (WSW)

WSW No.	Function	Reference Page
WSW01	Dial pulse setting	A-7
WSW02	Tone signal setting	A-8
WSW03	PABX mode setting	A-9
WSW04	TRANSFER facility setting	A-9
WSW05	1st dial tone and busy tone detection	A-10
WSW06	**Pause** button setting and 2nd dial tone detection	A-11
WSW07	Dial tone setting 1	A-13
WSW08	Dial tone setting 2	A-14
WSW09	Protocol definition 1	A-15
WSW10	Protocol definition 2	A-16
WSW11	Busy tone setting	A-17
WSW12	Signal detection condition setting	A-18
WSW13	Modem setting	A-19
WSW14	AUTO ANS facility setting	A-20
WSW15	REDIAL facility setting	A-21
WSW16	Function setting 1	A-22
WSW17	Function setting 2	A-23
WSW18	Function setting 3	A-24
WSW19	Transmission speed setting	A-25
WSW20	Overseas communications mode setting	A-26
WSW21	TAD setting 1	A-27
WSW22	ECM setting	A-27
WSW23	Communications setting	A-28
WSW24	TAD setting 2	A-29
WSW25	TAD setting 3	A-29
WSW26	Function setting 4	A-30
WSW27	Function setting 5	A-31
WSW28	Function setting 6	A-32
WSW29	Function setting 7	A-33
WSW30	Function setting 8	A-33
WSW31	Function setting 9	A-34
WSW32	Function setting 10	A-35
WSW33	Function setting 11	A-35
WSW34	Function setting 12	A-36
WSW35	Function setting 13	A-36
WSW36	Function setting 14	A-37
WSW37	Function setting 15	A-38
WSW38	Function setting 16	A-39
WSW39	Function setting 17	A-40
WSW40	Function setting 18	A-41
WSW41	Function setting 19	A-42
WSW42	Function setting 20	A-43
WSW43	Function setting 21	A-43
WSW44	Speeding up scanning-1	A-44
WSW45	Speeding up scanning-2	A-45
WSW46	Monitor of PC ON/OFF state	A-46
WSW47	Extending the closing state of the FAX line	A-46
WSW48	Function setting 23	A-47
WSW49	Function setting 24	A-47
WSW50	Not used.	A-47

WSW01 (Dial pulse setting)

Selector No.	Function	Setting and Specifications
1 2	Dial pulse generation mode	No. 1 2 0 0 : N 0 1 : N+1 1 0 : 10-N 1 1 : N
3 4	Break time length in pulse dialing	No. 3 4 0 0 : 60 ms 0 1 : 67 ms 1 0 : 40 ms (for 16 PPS) 1 1 : 64 ms (at 106-ms intervals)
5 6	Inter-digit pause	No. 5 6 0 0 : 800 ms 0 1 : 850 ms 1 0 : 950 ms 1 1 : 600 ms
7	Switching between pulse (DP) and tone (PB) dialing, by the function switch	0: Yes 1: No
8	Default dialing mode, pulse (DP) or tone (PB) dialing	0: PB 1: DP

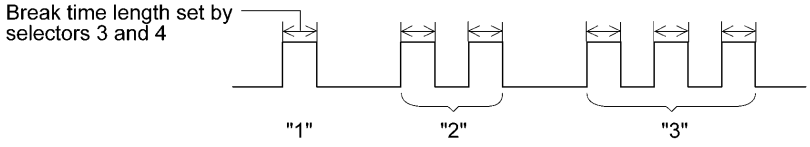
- **Selectors 1 and 2: Dial pulse generation mode**

  These selectors set the number of pulses to be generated in pulse dialing.

  N: Dialing "N" generates "N" pulses. (Dialing "0" generates 10 pulses.)
  N + 1: Dialing "N" generates "N + 1" pulses.
  10 - N: Dialing "N" generates "10 - N" pulses.

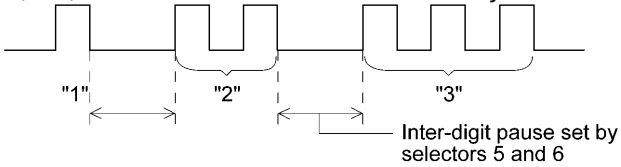
- **Selectors 3 and 4: Break time length in pulse dialing**

  These selectors set the break time length in pulse dialing.
  (Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)



- **Selectors 5 and 6: Inter-digit pause**

  These selectors set the inter-digit pause in pulse dialing.
  (Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)



- **Selector 7: Switching between pulse (DP) and tone (PB) dialing, by the function switch**

  This selector determines whether or not the dialing mode may be switched between the pulse (DP) and tone (PB) dialing by using the function switch.

- **Selector 8: Default dialing mode, pulse (DP) or tone (PB) dialing**

  This selector sets the default dialing mode (pulse dialing or tone dialing) which may be changed by the function switch. If the user switches it with the function switch when selector 7 is set to "0," the setting specified by this selector will also be switched automatically.

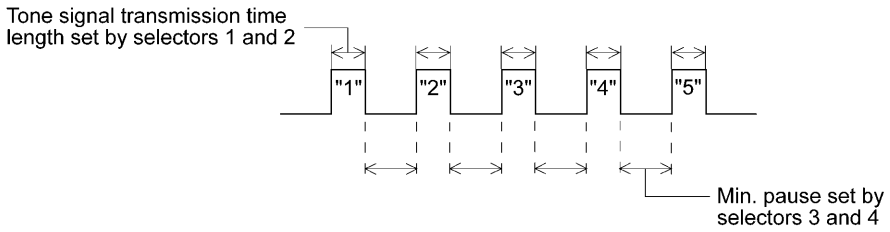
WSW02 (Tone signal setting)

Selector No.	Function	Setting and Specifications
1 2	Tone signal transmission time length	No. 1 2 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 100 ms
3 4	Min. pause in tone dialing	No. 3 4 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 140 ms
5 | 8	Attenuator for pseudo ring backtone to the line (selectable in the range of 0-15 dB)	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

- **Selectors 1 through 4: Tone signal transmission time length and Min. pause in tone dialing**

  These selectors set the tone signal transmission time length and minimum pause in tone dialing.

  (Example: If "1," "2," "3," "4," and "5" are dialed.)



- **Selectors 5 through 8: Attenuator for pseudo ring backtone to the line**

  These selectors are used to adjust the sound level of beep generated as a ring backtone in the F/T mode or as a signal during remote control operation or at the start of ICM recording.

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

WSW03 (PABX* mode setting)

Selector No.	Function	Setting and Specifications
1	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B
2 | 4	Not used.	
5	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B
6 | 8	Not used.	

* PABX: Private automatic branch exchange

NOTE:

Selectors 2 through 4, 6 and 8 are not applicable where no PABX is installed.

- **Selectors 1 and 5: CNG detection when sharing a modular wall socket with a telephone**

  These selectors determine whether or not the machine detects a CNG signal when a line is connected to a telephone sharing a modular wall socket with the machine. Upon detection of CNG signals by the number of cycles specified by these selectors, the machine interprets CNG as an effective signal and then starts FAX reception.

Selector No. 1	Selector No. 5	Cycle
0 (A)	0 (A)	0.5 cycle
0 (A)	1 (B)	1.0 cycle
1 (B)	0 (A)	1.5 cycles
1 (B)	1 (B)	2.0 cycles

WSW04 (TRANSFER facility setting)

Selector No.	Function	Setting and Specifications
1 | 6	Not used.	
7 8	Break time length for flash function	No. 7 8 0 0 : 80 ms 0 1 : 110 ms 1 0 : 250 ms 1 1 : 500 ms

NOTE:

Selectors 5 through 8 are not applicable in those countries where no transfer facility is supported.

- **Selectors 7 and 8: Break time length for flash function**

  These selectors set the break time length.

  This setting is effective only when the flash function is selected for the **R** key by using the function switch.

WSW05 (1st dial tone and busy tone detection)

Selector No.	Function	Setting and Specifications
1 | 3	1st dial tone detection	No. 1 2 3 0 0 0 : 3.5 sec. WAIT 0 0 1 : 7.0 sec. WAIT 0 1 0 : 10.5 sec. WAIT 0 1 1 : 14.0 sec. WAIT 1 0 0 : 17.5 sec. WAIT 1 0 1 : 21.0 sec. WAIT 1 1 0 : 24.5 sec. WAIT 1 1 1 : Detection (Without WAIT)
4	Max. pause time allowable for remote ID code detection	0 : 2 seconds 1: 1 second
5 6	Busy tone detection in automatic sending mode	No. 5 6 0 0 : No detection 0 1 : Detection only after dialing 1 0 : No detection 1 1 : Detection before and after dialing
7	Busy tone detection in automatic receiving mode	0 : Yes 1: No
8	Not used.	

NOTE:
Selectors 5 through 7 are not applicable in those countries where no busy tone detection is supported.

- **Selectors 1 through 3: 1st dial tone detection**

  These selectors activate or deactivate the 1st dial tone detection function which detects the 1st dial tone issued from the PSTN when a line is connected to the PSTN.

  Setting all of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected. For the detecting conditions of the 1st dial tone, refer to WSW07 and WSW08.

  Other setting combinations deactivate the dial tone detection function so that the machine starts dialing after the specified WAIT (3.5, 7.0, 10.5, 14.0, 17.5, 21.0, or 24.5 seconds) without detection of a dial tone when a line is connected to the PSTN.

- **Selector 4: Max. pause time allowable for remote ID code detection**

  This selector sets the maximum pause time allowable for detecting the second digit of a remote ID code after detection of the first digit in remote reception.

  If selector 4 is set to "0" (2 seconds), for instance, only a remote ID code whose second digit is detected within 2 seconds after detection of the first digit will become effective so as to activate the remote function.

- **Selectors 5 and 6: Busy tone detection in automatic sending mode**

  These selectors determine whether or not the machine automatically disconnects a line upon detection of a busy tone in automatic sending mode.

  Setting selector 6 to "0" ignores a busy tone so that the machine does not disconnect the line.

  Setting selectors 5 and 6 to "0" and "1," respectively, makes the machine detect a busy tone only after dialing and disconnect the line.

  Setting both of selectors 5 and 6 to "1" makes the machine detect a busy tone before and after dialing and then disconnect the line.

- **Selector 7: Busy tone detection in automatic receiving mode**

  This selector determines whether or not the machine automatically disconnects a line upon detection of a busy tone in automatic receiving mode.

WSW06 (Pause button setting and 2nd dial tone detection)

Selector No.	Function	Setting and Specifications
1 | 3	**Pause** button setting and 2nd dial tone detection	No. 1 2 3 0 0 0 : No pause 0 0 1 : 3.5 sec. WAIT 0 1 0 : 7 sec. WAIT 0 1 1 : 10.5 sec. WAIT 1 0 0 : 14 sec. WAIT 1 1 0 : 2nd dial tone detection only in pulse dialing (DP) system 1 0 1 : 2nd dial tone detection both in DP and push-button (PB) dialing system 1 1 1 :
4 | 6	Detection of 2nd dial tone	No. 4 5 6 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
7	No. of 2nd dial tone detection times	0: Once 1: Twice
8	2nd dial tone interrupt detecting time	0: 30 ms 1: 50 ms

- **Selectors 1 through 3: Pause button setting and 2nd dial tone detection**

Selectors 1 2 3	
0 0 0	No WAIT is inserted even if the **Pause** button is pressed.
0 0 1 0 1 0 0 1 1 1 0 0	If you press the **Pause** button during dialing, the machine will insert WAIT as defined in the above table. If the **Pause** button is pressed repeatedly, the machine inserts the specified WAIT multiplied by the number of depressions. It applies also in hook-up dialing.
1 0 1 1 1 0 1 1 1	When these selectors are set to "1, 0, 1": If you press the **Pause** button during dialing, the machine will wait for the 2nd dial tone to be sent via the communications line. When these selectors are set to "1, 1, 0" or "1, 1, 1": If you press the **Pause** button during dialing, the machine will first wait for the 2nd dial tone to be sent via the communications line. After that, the machine will insert a WAIT of 3.5 seconds. If no 2nd dial tone is received within the specified time length (set by WSW08), the machine will disconnect the line if in automatic dialing, or it will start transmitting the dial signal if given after depression of the **Pause** button in hook-up dialing.

- **Selectors 4 through 6: Detection of 2nd dial tone**

  Upon detection of the 2nd dial tone for the time length specified by these selectors, the machine starts dialing.

  This setting is effective only when the 2nd dial tone detection function is activated by selectors 1 through 3 (Setting 101, 110, or 111).

  This function does not apply in those countries where no dial tone detection function is supported.

- **Selector 7: No. of 2nd dial tone detection times**

  This selector sets the number of dial tone detection times required for starting dialing.

- **Selector 8: 2nd dial tone interrupt detecting time**

  This selector sets the allowable time length of an interrupt which should not be interpreted as an interrupt in the 2nd tone dialing.

WSW07 (Dial tone setting 1)

Selector No.	Function	Setting and Specifications
1 2	Frequency band range	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 X : Widens by 10 Hz
3	Not used.	
4 | 6	2nd dial tone detection level (Z = 600 Ω)	No. 4 5 6 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm
7	1st dial tone interrupt detecting time	0: 30 ms 1: 50 ms
8	Not used.	

NOTE:
Selectors 1, 2, 4 through 7 are not applicable in those countries where no dial tone or line current detection is supported, e.g., U.S.A.

- **Selectors 1 and 2: Frequency band range**

  These selectors set the frequency band for the 1st dial tone and the busy tone (before dialing) to be detected.

  This setting is effective only when selectors 1 through 3 of WSW05 are set to "1,1,1."

- **Selectors 4 through 6: 2nd dial tone detection level**

  These selectors set the detection level of the 2nd dial tone.

- **Selector 7: 1st dial tone interrupt detecting time**

  This selector sets the allowable time length of an interrupt which should not be interpreted as an interrupt in the 1st dial tone dialing.

WSW08 (Dial tone setting 2)

Selector No.	Function	Setting and Specifications
1 | 3	1st dial tone detection time length	No. 1 2 3 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
4 5	Time-out length for 1st and 2nd dial tone detection	No. 4 5 0 0 : 10 sec. 0 1 : 20 sec. 1 0 : 15 sec. 1 1 : 30 sec.
6 | 8	Detection level of 1st dial tone and busy tone before dialing	No. 6 7 8 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm

NOTE:
The WSW08 is not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: 1st dial tone detection time length**

  Upon detection of the 1st dial tone for the time length set by these selectors, the machine starts dialing.

  This setting is effective only when selectors 1 through 3 of WSW05 are set to "1,1,1."

- **Selectors 4 and 5: Time-out length for 1st and 2nd dial tone detection**

  These selectors set the time-out length for the 1st and 2nd dial tone detection so that the machine waits dial tone input for the specified time length and disconnects itself from the line when no dial tone is inputted.

WSW09 (Protocol definition 1)

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets 1: 64 octets
2	Use of non-standard commands	0: Allowed 1: Prohibited
3 4	No. of retries	No. 3 4 0 0 : 4 times 0 1 : 3 times 1 0 : 2 times 1 1 : 1 time
5	T5 timer	0: 300 sec. 1: 60 sec.
6	T1 timer	0: 35 sec. 1: 40 sec.
7 8	Elapsed time for time-out control for no response from the called station in automatic sending mode	No. 7 8 0 0 : 60 sec. (55 sec. for US and Canada) 0 1 : 140 sec. 1 0 : 90 sec. 1 1 : 35 sec.

NOTE:
Selectors 1 through 6 are not applicable in those models which do not support ECM.

- **Selector 1: Frame length selection**

  Usually a single frame consists of 256 octets (1 octet = 8 bits). For communications lines with higher bit error rate, however, set selector 1 to "1" so that the machine can divide a message into 64-octet frames.

  Remarks: The error correction mode (ECM) is a facsimile transmission manner in which the machine divides a message into frames for transmission so that if any data error occurs on the transmission line, the machine retransmits only those frames containing the error data.

- **Selector 2: Use of non-standard commands**

  If this selector is set to "0," the machine may use non-standard commands (the machine's native-mode commands, e.g., NSF, NSC, and NSS) for communications. If it is set to "1," the machine will use standard commands only.

- **Selectors 3 and 4: No. of retries**

  These selectors set the number of retries in each specified modem transmission speed.

- **Selector 5: T5 timer**

  This selector sets the time length for the T5 timer.

- **Selector 6: T1 timer**

  This selector sets the time length for the T1 timer.

- **Selectors 7 and 8: Elapsed time for time-out control**

  If the machine receives no response (no G3 command) from the called terminal in automatic sending during the time set by these selectors, it disconnects the line.

WSW10 (Protocol definition 2)

Selector No.	Function		Setting and Specifications
1	Not used.		
2	Time length from transmission of the last dial digit to CML ON		0: 100 ms 1: 50 ms
3	Time length from CML ON to CNG transmission		0: 2 sec. 1: 4 sec.
4	Time length from CML ON to CED transmission (except for facsimile-to-telephone switching)		0: 0.5 sec. 1: 2 sec.
5 6	No. of training retries		No. 5 6 0 0 : 1 time 0 1 : 2 times 1 0 : 3 times 1 1 : 4 times
7	Encoding system (Compression)	MR	0: Allowed 1: Not allowed
8		MMR	0: Allowed 1: Not allowed

- **Selector 2: Time length from transmission of the last dial digit to CML ON**

  This selector sets the time length from when the machine transmits the last dial digit until the CML relay comes on.

- **Selector 3: Time length from CML ON to CNG transmission**

  This selector sets the time length until the machine transmits a CNG after it turns on the CML relay.

- **Selector 4: Time length from CML ON to CED transmission**

  This selector sets the time length until the machine transmits a CED after it turns on the CML relay. This setting does not apply to switching between facsimile and telephone.

- **Selectors 5 and 6: No. of training retries**

  These selectors set the number of training retries to be repeated before automatic fallback.

- **Selectors 7 and 8: Encoding system (Compression)**

  This selector determines whether or not use of the MR/MMR coding system will be allowed.

WSW11 (Busy tone setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band range	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 x : Widens by 10 Hz
3	ON/OFF time length ranges (More than one setting allowed)	1: 250-750/250-750 ms
4		1: 400-600/400-600 ms
5		1: 175-440/175-440 ms
6		1: 100-1000/17-660 ms
7		1: 110-410/320-550 ms
8		1: 100-660/100-660 ms

NOTE:

- *WSW11 is not applicable in those countries where no busy tone detection is supported.*
- *The setting of WSW11 is effective only when selectors 5 and 6 of WSW05 are set to "0, 1" or "1, 1" (Busy tone detection).*

- **Selectors 1 and 2: Frequency band range**

  These selectors set the frequency band for busy tone to be detected.

- **Selectors 3 through 8: ON/OFF time length ranges**

  These selectors set the ON and OFF time length ranges for busy tone to be detected. If more than one selector is set to "1," the ranges become wider. For example, if selectors 4 and 5 are set to "1," the ON and OFF time length ranges are from 175 to 600 ms.

WSW12 (Signal detection condition setting)

Selector No.	Function	Setting and Specifications
1 2	Min. OFF time length of calling signal (Ci)	No. 1 2 0 0 : 1500 ms 0 1 : 500 ms 1 0 : 700 ms 1 1 : 900 ms
3 4	Max. OFF time length of calling signal (Ci)	No. 3 4 0 0 : 6 sec. 0 1 : 7 sec. 1 0 : 9 sec. 1 1 : 11 sec.
5 6	Detecting time setting	No. 5 6 0 0 : 800 ms 0 1 : 200 ms 1 0 : 250 ms 1 1 : 150 ms
7-8	Not used.	

- **Selectors 1 through 4: Min. and max. OFF time length of calling signal (Ci)**

  If the machine detects the OFF state of calling signal (Ci) for a time length which is greater than the value set by selectors 1 and 2 and less than the value set by selectors 3 and 4, it interprets the Ci signal as OFF.

- **Selectors 5 and 6: Detecting time setting**

  These selectors set the time length required to make the machine acknowledge itself to be called. That is, if the machine continuously detects calling signals with the frequency set by selectors 1 through 4 of WSW14 during the time length set by these selectors 5 and 6, it acknowledges the call.

WSW13 (Modem setting)

Selector No.	Function	Setting and Specifications
1 2	Cable equalizer	No. 1 2 0 0 : 0 km 0 1 : 1.8 km 1 0 : 3.6 km 1 1 : 5.6 km
3 4	Reception level	No. 3 4 0 0 : -43 dBm 0 1 : -47 dBm 1 0 : -49 dBm 1 1 : -51 dBm
5 | 8	Modem attenuator	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

The modem should be adjusted according to the user's line conditions.

- **Selectors 1 and 2: Cable equalizer**

  These selectors are used to improve the pass-band characteristics of analogue signals on a line. (Attenuation in the high-band frequency is greater than in the low-band frequency.)

  Set these selectors according to the distance from the telephone switchboard to the machine.

- **Selectors 3 and 4: Reception level**

  These selectors set the optimum receive signal level.

- **Selectors 5 through 8: Modem attenuator**

  These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies to G3 protocol signals.

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

  This setting will be limited if selector 8 of WSW23 is set to "0."

WSW14 (AUTO ANS facility setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band selection (Lower limit)	No. 1 2 0 0 : 13 Hz 0 1 : 15 Hz 1 0 : 23 Hz 1 1 : 20 Hz
3 4	Frequency band selection (Upper limit)	No. 3 4 0 0 : 30 Hz 0 1 : 55 Hz 1 0 : 70 Hz 1 1 : 200 Hz
5 | 8	No. of rings in AUTO ANS mode	No. 5 6 7 8 0 0 0 0 : Fixed to once 0 0 0 1 : Fixed to 2 times 0 0 1 0 : Fixed to 3 times 0 0 1 1 : Fixed to 4 times 0 1 0 0 : 1 to 2 times 0 1 0 1 : 1 to 3 times 0 1 1 0 : 1 to 4 times 0 1 1 1 : 1 to 5 times 1 0 0 0 : 2 to 3 times 1 0 0 1 : 2 to 4 times 1 0 1 0 : 2 to 5 times 1 0 1 1 : 2 to 6 times 1 1 0 0 : 1 to 10 times 1 1 0 1 : 2 to 10 times 1 1 1 0 : 3 to 5 times 1 1 1 1 : 4 to 10 times

- **Selectors 1 through 4: Frequency band selection**

  These selectors are used to select the frequency band of calling signals for activating the AUTO ANS facility.

  In the French versions, if the user sets the PBX to OFF from the control panel, the setting made by selectors 1 and 2 will take no effect and the frequency's lower limit will be fixed to 32 Hz. (Even if the setting made by these selectors does not apply, it will be printed on the configuration list.)

- **Selectors 5 through 8: No. of rings in AUTO ANS mode**

  These selectors set the number of rings to initiate the AUTO ANS facility.

WSW15 (REDIAL facility setting)

Selector No.	Function	Setting and Specifications
1 2	Selection of redial interval	No. 1 2 0 0 : 5 minutes 0 1 : 1 minute 1 0 : 2 minutes 1 1 : 3 minutes
3 | 6	No. of redialings	No. 3 4 5 6 0 0 0 0 : 16 times 0 0 0 1 : 1 times 0 0 1 0 : 2 times 0 0 1 1 : 3 times | | 1 1 1 1 : 15 times
7	Redialing for no response sent from the called terminal	0: Redialing 1: No redialing
8	CRP option	0: Disable 1: Enable

- **Selectors 1 through 6: Selection of redial interval and No. of redialings**

  The machine redials by the number of times set by selectors 3 through 6 at intervals set by selectors 1 and 2.

  This setting is effective only when selector 7 is set to "0."

- **Selectors 7: Redialing for no response sent from the called terminal**

  This selector determines whether or not the machine redials if no G3 command response comes from the called station after dialing within the time length set by selectors 7 and 8 of WSW09.

- **Selectors 8: CRP option**

  If a command error occurs in the equipment (calling station), the equipment usually waits for three seconds and then makes a retry three times. This CRP option is a request command that can be sent from the called station for requesting the calling station to retry the failed command immediately.

WSW16 (Function setting 1)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	CCITT superfine recommendation	0: OFF 1: ON
3 | 6	Not used.	
⑦	Max. document length limitation	0: 400 cm 1: 90 cm
8	**Stop/Exit** button pressed during reception	0: Not functional 1: Functional

- **Selector 2: CCITT superfine recommendation**

  If this selector is set to "1," the machine communicates in CCITT recommended superfine mode (15.4 lines/mm). If it is set to "0," it communicates in native superfine mode.

- **Selector 7: Max. document length limitation**

  This selector is used to select the maximum length of a document to be sent.

- **Selector 8: Stop key pressed during reception**

  If this selector is set to "1," pressing the **Stop/Exit** button can stop the current receiving operation. The received data will be lost.

WSW17 (Function setting 2)

Selector No.	Function	Setting and Specifications
1 2	Off-hook alarm	No. 1 2 0 0 : No alarm 0 1 : Always valid 1 X : Valid except when 'call reservation' is selected.
3 4	Not used.	
⑤	Calendar clock type	0: U.S.A. type 1: European type
6	Not used.	
7	Non-ring reception	0: OFF 1: ON
8	Not used.	

- **Selectors 1 and 2: Off-hook alarm**

  These selectors activate or deactivate the alarm function which sounds an alarm when the handset is off the hook after the communication is completed.

  The off-hook alarm works also for an external telephone connected to the EXT modular socket.

- **Selector 5: Calendar clock type**

  If this selector is set to "0" (USA), the MM/DD/YY hh:mm format applies; if it is set to "1" (Europe), the DD/MM/YY hh:mm format applies: DD is the day, MM is the month, YY is the last two digits of the year, hh is the hour, and mm is the minute.

- **Selector 7: Non-ring reception**

  Setting this selector to "1" makes the machine receive calls without ringer sound if the ring delay is set to 0.

WSW18 (Function setting 3)

Selector No.	Function	Setting and Specifications
1	Not used.	
2 3	Detection enabled time for CNG and no tone	No. 2 3 0 0 : 40 sec. 0 1 : 0 sec. (No detection) 1 0 : 5 sec. 1 1 : 80 sec.
4 5	Not used.	
6	Registration of station ID	0: Permitted 1: Prohibited
7 8	Tone sound monitoring	No. 7 8 0 X : No monitoring 1 0 : Up to phase B at the calling station only 1 1 : All transmission phases both at the calling and called stations

- **Selectors 2 and 3: Detection enabled time for CNG and no tone**

  After the line is connected via the machine or the external telephone, the machine can detect a CNG signal or no tone for the time length specified by these selectors. The setting specified by these selectors becomes effective only when selector 8 of WSW20 is set to "1."

- **Selectors 7 and 8: Tone sound monitoring**

  These selectors set monitoring specifications of the tone sound inputted from the line.

WSW19 (Transmission speed setting)

Selector No.	Function	Setting and Specifications
1 | 3	First transmission speed choice for fallback	No. 1 2 3 No. 4 5 6 0 0 0 : 2,400 bps 0 0 1 : 4,800 bps 0 1 0 : 7,200 bps 0 1 1 : 9,600 bps 1 0 0 : 12,000 bps 1 0 1 : 1 1 0 : 14,400 bps 1 1 1 :
4 | 6	Last transmission speed choice for fallback	
7	V. 34 mode	0: Permitted 1: Prohibited
8	V. 17 mode	0: Permitted 1: Prohibited

NOTE:
For the transmission speed setting in V.34 mode, refer to WSW39.

- **Selectors 1 through 6: First and last choices of transmission speed for fallback**

  These selectors are used to set the modem speed range. With the first transmission speed choice specified by selectors 1 through 3, the machine attempts to establish the transmission link via the modem. If the establishment fails, the machine automatically steps down to the next highest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 4 through 6.

  If the modem always falls back to a low transmission speed (e.g., 4,800 bps), set the first transmission speed choice to the lower one (e.g., modify it from 12,000 bps to 7,200 bps) in order to deactivate the high-speed modem function and reduce the training time for shorter transmission time.

  Generally, to save the transmission time, set the last transmission speed choice to a higher one.

- **Selector 7: V. 34 mode**

  This selector determines whether or not the machine communicates with the remote station in the V. 34 mode when that station supports the V. 34 mode.

WSW20 (Overseas communications mode setting)

Selector No.	Function	Setting and Specifications
1	EP* tone prefix	0: OFF 1: ON
2	Overseas communications mode (Reception)	0: 2100 Hz 1: 1100 Hz
3	Overseas communications mode (Transmission)	0: OFF 1: Ignores DIS once.
4 5	Min. time length from reception of CFR to start of transmission of video signals	No. 4 5 0 0 : 100 ms 0 1 : 200 ms 1 0 : 300 ms 1 1 : 400 ms
6 7	Chattering noise elimination at detection of CNG	No. 6 7 0 0 : Yes (When CNG goes either ON or OFF) 0 1 : Yes (Only when CNG goes OFF) 1 0 : No 1 1 : No
8	CNG detection on/off	0: OFF 1: ON

* EP: Echo protection

- **Selector 1: EP tone prefix**

  Setting this selector to "1" makes the machine transmit a 1700 Hz echo protection (EP) tone immediately preceding training in V.29 modulation system to prevent omission of training signals.

  Prefixing an EP tone is effective when the machine fails to transmit at the V.29 modem speed and always has to fall back to 4800 bps transmission.

- **Selectors 2 and 3: Overseas communications mode**

  These selectors should be used if the machine malfunctions in overseas communications. According to the communications error state, select the signal specifications.

  Setting selector 2 to "1" allows the machine to use 1100 Hz CED signal instead of 2100 Hz in receiving operation. This prevents malfunctions resulting from echoes, since the 1100 Hz signal does not disable the echo suppressor (ES) while the 2100 Hz signal does.

  Setting selector 3 to "1" allows the machine to ignore a DIS signal sent from the called station once in sending operation. This operation suppresses echoes since the first DIS signal immediately follows a 2100 Hz CED (which disables the ES) so that it is likely to be affected by echoes in the disabled ES state. However, such a disabled ES state will be removed soon so that the second and the following DIS signals are not susceptible to data distortion due to echoes. Note that some models when called may cause error by receiving a self-outputted DIS.

- **Selectors 8: CNG detection on/off**

  If this selector is set to "1," the machine detects a CNG signal according to the condition preset by selectors 2 and 3 of WSW18 after a line is connected. If it is set to "0," the machine detects a CNG signal as long as the line is connected.

WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1 | 7	Not used.	
8	Erasure of message stored in the memory after the message transfer	0: Yes 1: No

- **Selector 8: Erasure of message**

  Setting this selector to "0" will erase the message recorded in the memory after the document retrieval feature transfers the message.

WSW22 (ECM setting)

Selector No.	Function	Setting and Specifications
1	ECM* in sending	0: ON 1: OFF
2	ECM* in receiving	0: ON 1: OFF
3	Call Waiting Caller ID	0: ON 1: OFF
4 | 8	Not used.	

* ECM: Error correction mode

NOTE:

- *Selector 3 is applicable to the American version only, but not applicable to those models equipped with high-speed modem.*
- *Selectors 5 through 8 are applicable to the Asian version only.*

- **Selector 3: Call Waiting Caller ID**

  Setting this selector to "0" allows the user to decide whether or not to interrupt the current call when a new call comes in. If Call Waiting Caller ID service is available in the area and the user subscribes to it, he/she can see information about his/her incoming call.

WSW23 (Communications setting)

Selector No.	Function	Setting and Specifications
1	Starting point of training check (TCF)	0: From the head of a series of zeros 1: From any arbitrary point
2 3	Allowable training error rate	No. 2 3 0 0 : 0% 0 1 : 0.5% 1 0 : 1% 1 1 : 2%
4 5	Decoding error rate for transmission of RTN	No. 4 5 0 0 : 16% 0 1 : 14% 1 0 : 10% 1 1 : 8%
6 7	Not used.	
8	Limitation of attenuation level	0: Yes 1: No

NOTE:
Selector 8 is not applicable to the French versions.

- **Selector 1: Starting point of training check (TCF)**

  At the training phase of receiving operation, the called station detects for 1.0 second a training check (TCF) command, a series of zeros which is sent from the calling station for 1.5 seconds to verify training and give the first indication of the acceptability of the line.

  This selector sets the starting point from which the called station should start counting those zeros. If this selector is set to "0," the called station starts counting zeros 100 ms after the head of a series of zeros is detected.

  If it is set to "1," the called station starts counting zeros upon detection of 10-ms successive zeros 50 ms after the head of a series of zeros is detected. In this case, if the detection of 10-ms successive zeros is too late, the data counting period will become less than 1.0 second, making the called station judge the line condition unacceptable.

- **Selectors 2 and 3: Allowable training error rate**

  The called station checks a series of zeros gathered in training (as described in Selector 1) according to the allowable training error rate set by these selectors. If the called station judges the line condition to be accepted, it responds with CFR; if not, it responds with FTT.

- **Selectors 4 and 5: Decoding error rate for transmission of RTN**

  The machine checks the actual decoding errors and then transmits an RTN according to the decoding error rate (Number of lines containing an error per page ÷ Total number of lines per page) set by these selectors.

- **Selector 8: Limitation of attenuation level**

  Setting this selector to "0" limits the transmitting level of the modem to 10 dB.

  This setting has priority over the settings selected by WSW02 (selectors 5 through 8) and WSW13 (selectors 5 through 8).

WSW24 (TAD setting 2)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3 4	Time length from CML ON to start of pseudo ring backtone transmission	No. 3 4 0 0 : 4 sec. 0 1 : 3 sec. 1 0 : 2 sec. 1 1 : 1 sec.
5 | 8	Not used.	

- **Selectors 3 and 4: Time length from CML ON to start of pseudo ring backtone transmission**

  These selectors set the length of time from CML-ON up to the start of pseudo ring backtone transmission.

WSW25 (TAD setting 3)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5 | 7	Pause between paging number and PIN	No. 5 6 7 0 0 0 : 2 sec. 0 0 1 : 4 sec. 0 1 0 : 6 sec. 0 1 1 : 8 sec. 1 0 0 : 10 sec. 1 0 1 : 12 sec. 1 1 0 : 14 sec. 1 1 1 : 16 sec.
8	Not used.	

- **Selectors 5 through 7: Pause between paging number and PIN**

  These selectors set the pause time between a telephone number being paged and PIN (private identification number) for the paging feature.

WSW26 (Function setting 4)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3	Dialing during document reading into the temporary memory in in-memory message transmission	0: Disabled 1: Enabled
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode)	No. 4 5 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode)	No. 4 5 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
8	Not used.	

NOTE:
Selectors 6 and 7 take effect only in the V.34 mode.

- **Selector 3: Dialing during document reading into the temporary memory in in-memory message transmission**

  If this selector is set to "0," the machine waits for document reading into the memory to complete and then starts dialing. This enables the machine to list the total number of pages in the header of the facsimile message.

- **Selectors 4 and 5: No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode)**

  The machine interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone except in the external TAD mode.

- **Selectors 6 and 7: No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode)**

  The machine interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode.

WSW27 (Function setting 5)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Ringer OFF setting	0: Yes 1: No
3	Not used.	
4	Detection of distinctive ringing pattern	0: No 1: Yes
5 | 8	Not used.	

NOTE:

- *Selector 1 takes effect only in models/versions having a TEL key.*
- *Selector 4 is applicable only to the U.S.A. versions.*

- **Selector 2: Ringer OFF setting**

  This selector determines whether or not the ringer can be set to OFF.

- **Selector 4: Detection of distinctive ringing pattern**

  If this selector is set to "1," the machine detects only the number of rings; if it is set to "0," the machine detects the number of rings and the ringing time length to compare the detected ringing pattern with the registered distinctive one.

WSW28 (Function setting 6)

Selector No.	Function	Setting and Specifications
1 | 3	Transmission level of DTMF high-band frequency signal	No. 1 2 3 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
4 | 6	Transmission level of DTMF low-band frequency signal	No. 4 5 6 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
7 8	Not used.	

- **Selectors 1 through 6: Transmission level of DTMF high-/low-band frequency signal**

  These selectors are intended for the manufacturer who tests the machine for the Standard. Never access them.

WSW29 (Function setting 7)

Selector No.	Function	Setting and Specifications
1 | 8	Not used.	

WSW30 (Function setting 8)

Selector No.	Function	Setting and Specifications
1 | 3	Not used.	
④	Duty cycle control of pulsed current for the heat-fixing unit	0: OFF 1: ON
⑤	Drum cleaning prompt settings	0: ON 1: OFF
6 | 8	Not used.	

NOTE:
Selector 4 is applicable to the European version only.

- **Selector 4: Duty cycle control of pulsed current for the heat-fixing unit**

  Setting this selector to "1" activates the duty cycle control that suppresses the rush current. The duty cycle is 10-ms ON and 20-ms OFF.

  However, the duty cycle control may emit switching noise to the AC line. Depending upon the codes and regulations in the country, this selector should be set to "0."

- **Selector 5: Drum cleaning prompt settings**

  Setting this selector to "1" (OFF) deactivates all of the drum cleaning prompt settings enabled by selectors 5 to 7 of WSW42.

WSW31 (Function setting 9)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Default reduction rate for failure of automatic reduction during recording	0: ON 1: OFF
3 4	Not used.	
5	Minimum short-OFF duration in distinctive ringing	0: 130 ms 1: 90 ms
6 7	Not used.	
⑧	"CHANGE DRUM SOON" message	0: Yes 1: No

- **Selector 2: Default reduction rate for failure of automatic reduction during recording**

  This selector sets the default reduction rate to be applied if the automatic reduction function fails to record one-page data sent from the calling station in a single page of the current recording paper.

  If it is set to "0," the machine records one-page data at full size (100%) without reduction; if it is set to "1," the machine records it at the size* specified according to the current paper size.

- **Selector 5: Minimum short-OFF duration in distinctive ringing**

  The ringer pattern consists of short and long rings, e.g., short-short-long rings. This selector sets the minimum OFF duration following a short ring in order to avoid missing ringer tones in distinctive ringing.

  If this selector is set to "1," when the short-OFF duration is a minimum of 90 ms long, then the machine will interpret the short-OFF as OFF.

- **Selector 8: "CHANGE DRUM SOON" message**

  This selector determines whether or not the "CHANGE DRUM SOON" message should appear on the LCD when the service life of the laser-sensitive drum in the laser unit will expire soon.

WSW32 (Function setting 10)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5 6	Default resolution	No. 5 6 0 0 : Standard 0 1 : Fine 1 0 : Super fine 1 1 : Photo
7 8	Default contrast	No. 7 8 0 X : Automatic 1 0 : Super light 1 1 : Super dark

- **Selectors 5 and 6: Default resolution**

  These selectors set the default resolution which applies when the machine is powered up or completes a transaction.

- **Selectors 7 and 8: Default contrast**

  These selectors set the default contrast which applies when the machine is powered up or completes a transaction.

WSW33 (Function setting 11)

Selector No.	Function	Setting and Specifications
1 | 5	Not used.	
6	Report output of polled transmission requests	0: Yes 1: No
7 8	Not used.	

NOTE:
Selector 6 is not applicable to American versions.

WSW34 (Function setting 12)

Selector No.	Function	Setting and Specifications
1 | 5	Not used.	
6 7	Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation	No. 6 7 0 0 : 3 0 1 : 2 1 0 : 1 1 1 : OFF
8	Not used.	

NOTE:
Selectors 4 and 5 are not applicable to the American version.

- **Selectors 6 and 7: Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation**

  If the machine receives this specified number of DTMF tone signals during external TAD operation, it will not detect CNG afterwards.

  If these selectors are set to "1, 1," the CNG detection will not be inhibited.

WSW35 (Function setting 13)

Selector No.	Function	Setting and Specifications
1 | 8	Not used.	

WSW36 (Function setting 14)

Selector No.	Function	Setting and Specifications
①	ECP* mode	0: ON 1: OFF
②	Recovery from inactive PC interface	0: Disabled 1: Enabled
③	PC power-off recognition time	0: Normal 1: Long
4	Not used.	
5	Escape from phase C	0: Yes 1: No
6 | 8	Lower limit of frequency to be ignored after detection of calling signals (Ci)	No. 6 7 8 0 0 0 : 0 (Not ignored) 0 0 1 : 4 (448 Hz) 0 1 0 : 8 (244 Hz) 0 1 1 : 12 (162 Hz) 1 0 0 : 16 (122 Hz) 1 0 1 : 20 (97 Hz) 1 1 0 : 24 (81 Hz) 1 1 1 : 28 (69 Hz)

*ECP (Enhanced Capabilities Port)

- **Selector 1: ECP mode**

  The ECP mode enhances the normal bidirectional communications between the machine and the connected PC for higher transmission speed.

- **Selector 2: Recovery from inactive PC interface**

  If the machine recognizes via the STB signal line that the connected PC is powered off, it will turn the PC interface outputs Low to protect the PC from hazards that could be caused by weak electric current accidentally flown from the machine.

  This selector determines whether the machine should recover from the inactive PC interface to normal interfacing state upon receipt of data from the PC.

- **Selector 3: PC power-off recognition time**

  This selector sets the time length from when the machine detects the PC powered off until it recognizes the detected state as power-off.

  If selector 2 is set to "0," it is recommended that selector 3 be set to "1": otherwise, the machine may mistakenly detect PC powered off.

- **Selector 5: Escape from phase C**

  This selector determines whether or not the machine will escape from phase C when it detects an RTC (Return to Control) in non-ECM mode or an RCP (Return to Control Partial page) in ECM mode.

- **Selectors 6 through 8: Lower limit of frequency to be ignored after detection of calling signals (Ci)**

  At the start of reception, if the machine detects the frequency of calling signals (Ci) specified by selectors 1 through 4 of WSW14, it will start the ringer sounding. When doing so, the machine may fail to detect the calling signals normally due to noises superimposed at the time of reception. To prevent it, use selectors 6 through 8 of WSW36.

  If the machine detects higher frequencies than the lower limit specified by these selectors, it will regard them as noise and interpret that detecting state as being normal, allowing the ringer to keep sounding (until the machine starts automatic reception of FAX data if in the FAX mode, according to the preset number of ringers).

WSW37 (Function setting 15)

Selector No.	Function	Setting and Specifications
1	Printout of the stored image data of an unsent document onto the error report	0: No 1: Yes
2	Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission	0: No 1: Yes
3 | 8	Not used.	

- **Selector 1: Printout of the stored image data of an unsent document onto an error report**

  This selector determines whether or not the 1st-page image data of a document will be printed out onto the error report if the document image data stored in the temporary memory cannot be transmitted normally.

- **Selector 2: Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission**

  If in-memory message transmission fails repeatedly when selector 1 is set to "1," the temporary memory will be occupied with image data. Setting selector 2 to "1" will automatically erase the stored 1st-page image data of an unsent document at the time of the subsequent in-memory message transmission only when recording paper or toner runs out.

WSW38 (Function setting 16)

Selector No.	Function	Setting and Specifications
1 2	Setting of the equalizer	No. 1 2 0 X Automatic 1 0 : Fixed to 4 points 1 1 : Fixed to 16 points
3	Sending level of guard tone at phase 2	0: Normal - 7 db 1: Normal
4	Stepping down the transmission speed at fallback each	0: 2400 bps 1: 4800 bps
5 6	Automatic control of modem's EQM gain for proper transmission speed choice	No. 5 6 0 0 For higher transmission speed than the current setting 0 1 : No change from the current setting 1 0 : For lower transmission speed than the current setting 1 1 : For further lower transmission than the setting made by 1, 0
7	Redialing when a communications error occurs	0: ON 1: OFF
8	CED detection for CNG stoppage	0: ON 1: OFF

NOTE:
WSW38 takes effect only in the V. 34 mode.

- **Selectors 1 and 2: Setting of the equalizer**

  These selectors set the equalizer's training level to be applied if the machine fails to send training due to weak line connection. If these selectors are set to "0, X," the modem will automatically set the appropriate training level.

- **Selector 3: Sending level of guard tone at phase 2**

  This selector sets the sending level of guard tone for 1800 Hz to be sent at Phase 2 in the V. 34 mode.

- **Selector 4: Stepping down the transmission speed at fallback each**

  This selector determines how much the modem steps down the transmission speed at fallback when called by the remote station. If this selector is set to "1," the modem may step down the transmission speed from 33600 bps to 28800 bps by one-time fallback.

- **Selectors 5 and 6: Automatic control of modem's EQM gain for proper transmission speed choice**

  These selectors determine how the modem controls the EQM (Eye Quality Monitor) gain for proper choice of the transmission speed, which applies if the modem selects higher transmission speed than the possible speed so that it always repeats falling back.

WSW39 (Function setting 17)

Selector No.	Function	Setting and Specifications
1 | 4	First transmission speed choice for fallback	No. 1 2 3 4 / No. 5 6 7 8 0 0 0 0 : 2400 bps 0 0 0 1 : 4800 bps 0 0 1 0 : 7200 bps 0 0 1 1 : 9600 bps 0 1 0 0 : 12000 bps 0 1 0 1 : 14400 bps 0 1 1 0 : 16800 bps 0 1 1 1 : 19200 bps 1 0 0 0 : 21600 bps 1 0 0 1 : 24000 bps 1 0 1 0 : 26400 bps 1 0 1 1 : 28800 bps 1 1 0 0 : 31200 bps 1 1 0 1 : 33600 bps 1 1 1 0 : 33600 bps 1 1 1 1 : 33600 bps
5 | 8	Last transmission speed choice for fallback	

NOTE:

WSW39 takes effect only in V. 34 mode. For the transmission speed setting in other modes, refer to WSW19.

- **Selectors 1 through 8: First and last choices of transmission speed for fallback**

  These selectors are used to set the modem speed range. With the first transmission speed choice specified by selectors 1 through 4, the machine attempts to establish the transmission link via the modem. If the establishment fails, the machine automatically steps down to the next highest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 5 through 8.

  If the modem always falls back to a low transmission speed (e.g., 24,000 bps), set the first transmission speed choice to the lower one (e.g., modify it from 31,200 bps to 26,400 bps) in order to deactivate the high-speed modem function and reduce the training time for shorter transmission time.

  WSW39 will be limited by selectors 3 through 8 of WSW40.

WSW40 (Function setting 18)

Selector No.	Function	Setting and Specifications		
1-2	Not used.			
3 | 8	Masking of symbol rate(s)		Not masking	Masking
		No. 3	0	1 3429 symbols/sec
		No. 4	0	1 3200 symbols/sec
		No. 5	0	1 3000 symbols/sec
		No. 6	0	1 2800 symbols/sec
		No. 7	-	- Not used.
		No. 8	0	1 2400 symbols/sec

NOTE:

- *WSW40 takes effect only in the V. 34 mode.*
- *Selector 2 is applicable only to models equipped with a flat-bed scanner.*

- **Selectors 3 and 8: Masking of symbol rate(s)**

  These selectors allow you to limit the transmission speed range in the V. 34 mode by masking the desired symbol rate(s). Transmission speeds assigned to the symbol rates are listed below. The setting made by these selectors will limit the setting made by selectors 1 through 4 of WSW39.

  If selector 3 is set to "1" to mask the 3429 symbols/second when the first transmission speed choice is 33600 bps (specified by selectors 1 through 4 of WSW39), for example, the allowable maximum transmission speed will be limited to 31200 bps. If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 33600 bps, then the allowable maximum transmission speed remains 33600 bps.

  If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 21600 bps (specified by selectors 1 through 4 of WSW39), the allowable maximum transmission speed remains 21600 bps but the minimum transmission speed will be limited to 4800 bps.

Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)
2400	2400	3000	4800	3429	4800
	4800		7200		7200
	7200		9600		9600
	9600		12000		12000
	12000		14400		14400
	14400		16800		16800
	16800		19200		19200
	19200		21600		21600
	21600		24000		24000
2800	4800		26400		28800
	7200		28800		31200
	9600	3200	4800		33600
	12000		7200		
	14400		9600		
	16800		12000		
	19200		14400		
	21600		16800		
	24000		19200		
	26400		21600		
			24000		
			26400		
			28800		
			31200		

WSW41 (Function setting 19)

Selector No.	Function	Setting and Specifications
1 | 3	ON-duration of the fluorescent lamp built in the CIS unit (Not used.)	No. 1 2 3 0 0 0 : 16 hours 0 0 1 : 24 hours 0 1 0 : 12 hours 0 1 1 : 8 hours 1 0 0 : 4 hours 1 0 1 : 2 hours 1 1 0 : 10 minutes 1 1 1 : 0 minute
4	Broadcast report via e-mail	0: ON 1: OFF
5 | 8	Modem attenuator	No. 5 6 7 8 0 0 0 0 : -10 dBm 0 0 0 1 : -11 dBm 0 0 1 0 : -12 dBm 0 0 1 1 : -13 dBm 0 1 0 0 : -14 dBm | | 1 1 1 1 : -25 dBm

NOTE:

- *WSW41 takes effect only in the V. 34 mode.*
- *Selectors 1 through 3 are applicable only to models equipped with a flat-bed scanner.*

- **Selectors 1 through 3: ON-duration of the fluorescent lamp built in the CIS unit (Not used.)**

  If the scanning operation is started when the fluorescent lamp is off, then the lamp will come on for scanning. These selectors determine how long the lamp will stay ON after scanning.

  If these selectors are set to “1, 1, 1,” the fluorescent lamp will go off after the scanning sequence.

- **Selectors 5 through 8: Modem attenuator**

  These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies to super G3 protocol signals.

WSW42 (Function setting 20)

Selector No.	Function	Setting and Specifications
1	Incoming mail server POP*[1]	0: OFF 1: ON
2	Incoming mail server SMTP*[2]	0: OFF 1: ON
3	Internet-FAX forward function	0: OFF 1: ON
4	JBIG*[3] coding system	0: Disabled 1: Enabled
5-8	Not used.	

*[1] POP: Post Office Protocol
*[2] SMTP: Simple Mail Transfer Protocol
*[3] JBIG: Joint Bi-level Image Group

NOTE:

- *Selectors 1 through 3 are applicable to those models equipped with LAN interface.*

- **Selector 3: Internet-FAX forward function**

  If this selector is set to "ON," the machine may forward a FAX message received through Internet to other remote G3 facsimile equipment.

WSW43 (Function setting 21)

Selector No.	Function	Setting and Specifications
1	Addition of a header (station ID) to FAX images to be sent to PCs having e-mail addresses	0: Yes 1: No
2 3	Wait time for PCFax reception (Class 2) and FPTS command transmission	No. 2 3 0 0 : 50 ms 0 1 : 100 ms 1 0 : 150 ms 1 1 : 0 ms
4 5	Detection time of 2100 Hz CED or ANSam	No. 4 5 0 0 : 200 ms 0 1 : 300 ms 1 0 : 400 ms 1 1 : 500 ms
6	Not used.	
7	Automatic start of remote maintenance	0: No 1: Yes
8	JPEG coding (Not used.)	0: Disabled 1: Enabled

NOTE:

Selector 1 is applicable to those models equipped with LAN interface.

- **Selector 8: JPEG coding (Not used.)**

  Setting this selector to “0” disables the equipment from sending/receiving JPEG color images and from receiving JPEG monochrome images.

WSW44 (Speeding up scanning-1)

Selector No.	Function	Setting and Specifications
1 | 5	Not used.	
6 | 8	Effective time length of the white level compensation data obtained beforehand (Not used.)	No. 6 7 8 0 0 0 : Obtained compensation data ineffective 0 0 1 : 1 min. 0 1 0 : 3 min. 0 1 1 : 5 min. 1 0 0 : 10 min. 1 0 1 : 15 min. 1 1 0 : 20 min. 1 1 1 : 30 min.

NOTE:
WSW44 is applicable only to models equipped with a flat-bed scanner.

- **Selectors 6 through 8: Effective time length of the white level compensation data obtained beforehand (Not used.)**

  If you set documents in the ADF and the document front sensor detects them or if you open the document tray ASSY and the document tray open sensor detects the open state, then the controller will make correction of the reference voltage to be applied to white level compensation for document scanning before the Copy button is pressed.

  These selectors determine how long compensation data obtained beforehand will keep effective.

WSW45 (Speeding up scanning-2)

Selector No.	Function	Setting and Specifications
1 | 3	Delay time from when documents are set until the ADF starts drawing them in (Not used.)	No. 1 2 3 0 0 0 : No automatic drawing-in 0 0 1 : 1 sec. 0 1 0 : 2 sec. 0 1 1 : 3 sec. 1 0 0 : 4 sec. 1 0 1 : 5 sec. 1 1 0 : 6 sec. 1 1 1 : 7 sec.
4 | 6	Periodical correction intervals of the reference voltage to be applied to white level compensation for document scanning, during standby (Not used.)	No. 4 5 6 0 0 0 : No correction of reference voltage during standby 0 0 1 : 10 sec. 0 1 0 : 30 sec. 0 1 1 : 1 min. 1 0 0 : 3 min. 1 0 1 : 5 min. 1 1 0 : 10 min. 1 1 1 : 30 min.
7	Standby position of the CIS unit (Not used.)	0: CIS lock position (Home position) 1: Location of the white-level reference film
8	Not used.	

NOTE:
WSW45 is applicable only to models equipped with a flat-bed scanner.

- **Selectors 1 through 3: Delay time from when documents are set until the ADF starts drawing them in (Not used.)**

  These selectors determine how long the ADF will delay automatic drawing-in of documents (to the scanning standby position) after you set them in the ADF, as well as determining whether or not the ADF automatically draws in documents.

- **Selectors 4 through 6: Periodical correction intervals of the reference voltage applied to white level compensation for document scanning, during standby (Not used.)**

  These selectors set the correction intervals (in seconds) of the reference voltage to be applied to white level compensation for document scanning during standby, as well as determining whether or not the controller makes the reference voltage correction during standby. (Conventionally, the correction has been made immediately before the start of actual scanning)

  This function takes effect in copying. Making the correction during standby may shorten the preparation time for copying.

NOTE:
Do not access these selectors.

- **Selector 7: Standby position of the CIS unit (Not used.)**

  This selector determines whether the standby position of the CIS unit should be the CIS lock position (home position) or the location of the white-level reference film (attached to the inside of the scanner top cover). If the location of the reference film is selected, the CIS unit will not return to the lock position so as to shorten the travel time, decreasing the preparation time for copying.

WSW46 (Monitor of PC ON/OFF state)

Selector No.	Function	Setting and Specifications
1 2	Monitoring the PC ON/OFF state	No. 1 2 0 0 : Disabled 0 1 : Monitor SELECT IN 1 0 : Monitor STROBE 1 1 : Monitor both SELECT IN and STROBE
3	Parallel port output pins kept at high level	0: Enabled 1: Disabled
4	Scanned garbage correction processing	0: ON 1: OFF
5 | 8	Not used.	

NOTE:

- *Selector 3 is applicable only to models equipped with a parallel interface.*
- *Selectors 6 through 8 are applicable only to models equipped with a flat-bed scanner.*

- **Selectors 1 and 2: Monitoring the PC ON/OFF state**

  For the related functions, refer to WSW36, selectors 2 and 3.

- **Selectors 3: Parallel port output pins kept at high level**

  Setting this selector to “0” will keep all parallel output pins of the facsimile equipment at high level. Use this setting if Resource Manager (bundled with MFC models) installed to Windows NT running on the connected PC fails to monitor the power ON/OFF state of the facsimile equipment.

WSW47 (Extending the closing state of the FAX line)

Selector No.	Function	Setting and Specifications
1 | 7	Not used.	
8	Switching of USB 2.0 High-Speed/USB 1.1 Full-Speed	0: Auto (Automatic switching) 1: USB 1.1 Full-Speed is set.

WSW48 (Function setting 23)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3 | 5	Number of pieces of (scan) key information registered according to application (i.e., Number of PCs that can be registered via Net) <Available Function> - PC registration using the Network TWAIN	0 0 0 : 25 pcs. 0 0 1 : 50 pcs. 0 1 0 : 75 pcs. 0 1 1 : 100 pcs. 1 0 0 : 125 pcs. 1 0 1 : 150 pcs. 1 1 0 : 175 pcs. 1 1 1 : 200 pcs.
6 | 8	Not used.	

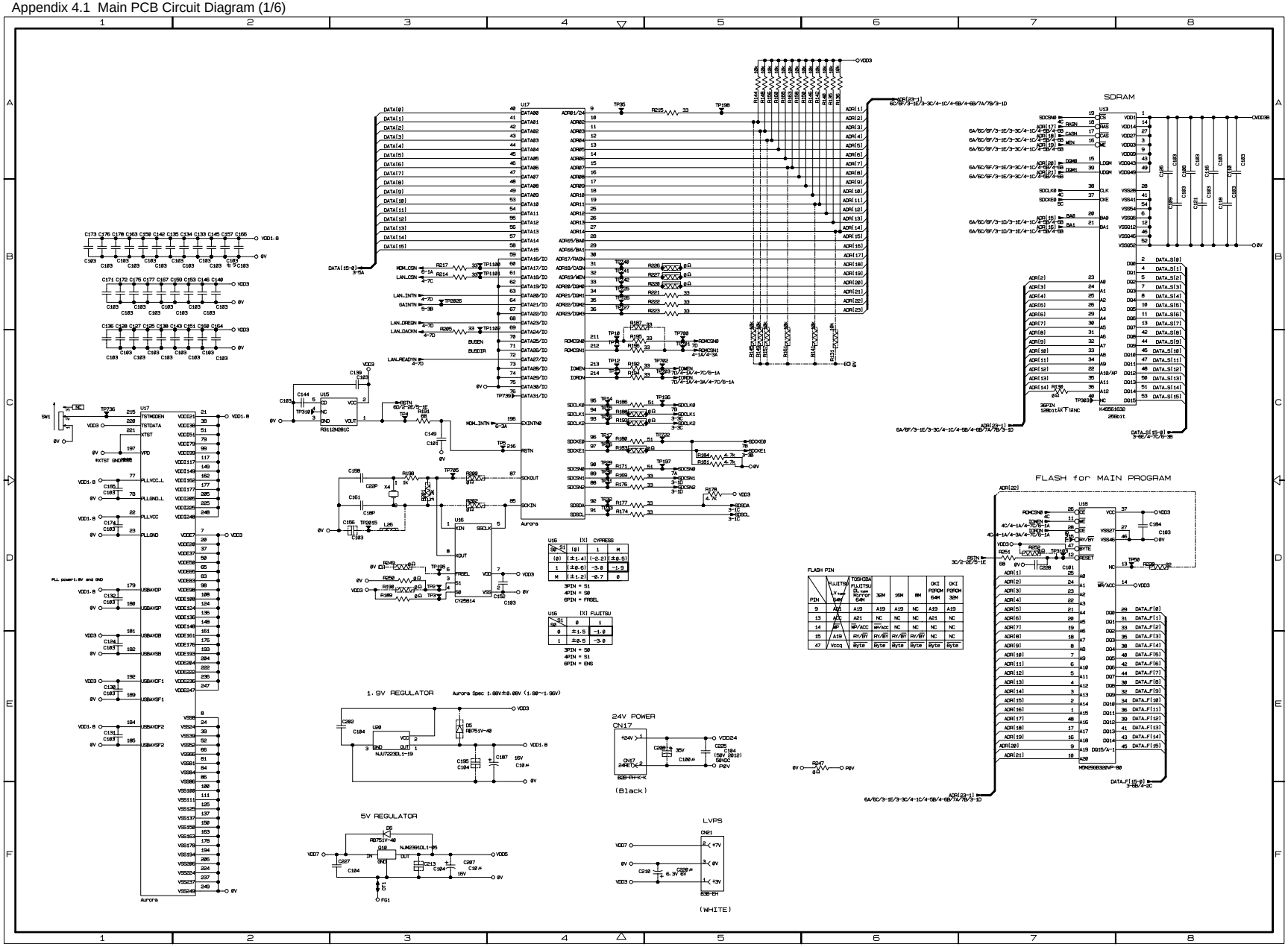
WSW49 (Function setting 24)

Selector No.	Function	Setting and Specifications
1 2	Size of the RAM Disk when using PCL/PS	0 0 : None 0 1 : 1 Mbytes 1 0 : 2 Mbytes 1 1 : 4 Mbytes
3	Presence or absence of copy completion sound	0: Present 1: Absent
4 5	Flag detection time when receiving a command [*]	0 0 : 150 ms 0 1 : 350 ms 1 0 : 550 ms 1 1 : 750 ms
6 7	Scanning light source WARMUP time Adjustment <Models concerned: CCD scanning type> [*] [BHM-3838] (Not used.)	0 0 : No adjustment 0 1 : 80% 1 0 : 120% 1 1 : 150%
8	Not used.	

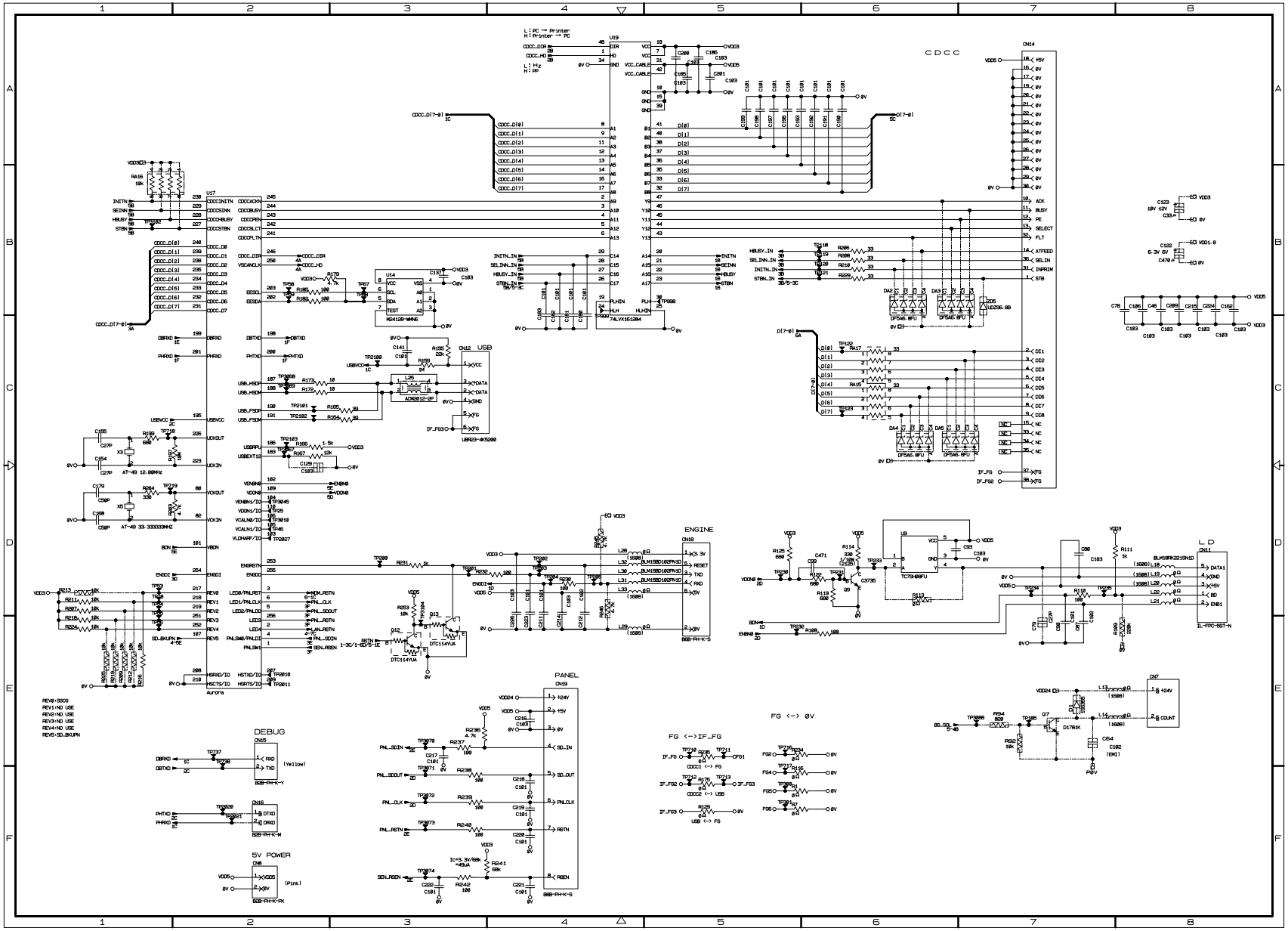
WSW50

Selector No.	Function	Setting and Specifications
1 | 8	Not used.	

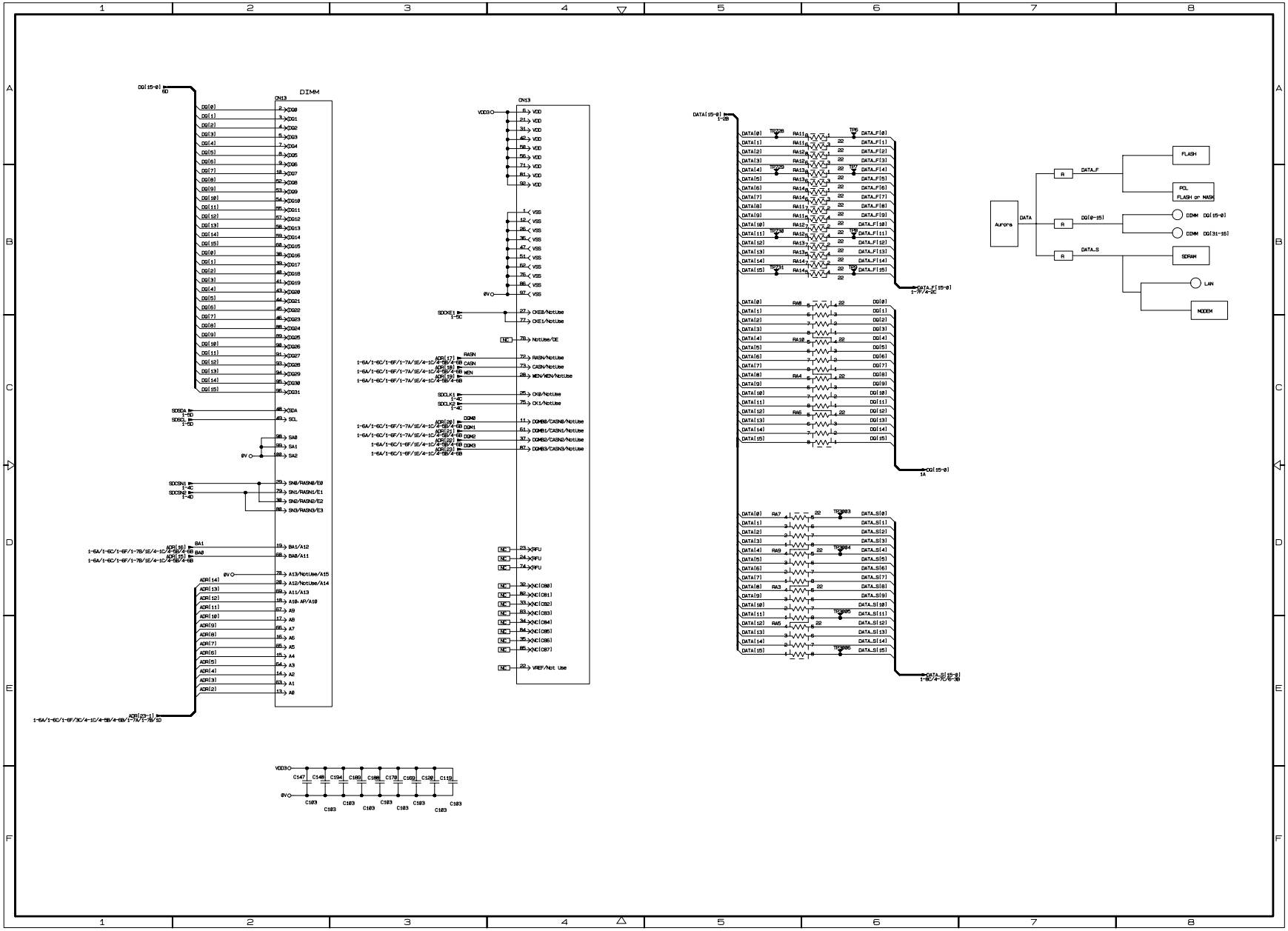
Appendix 4.1 Main PCB Circuit Diagram (1/6)



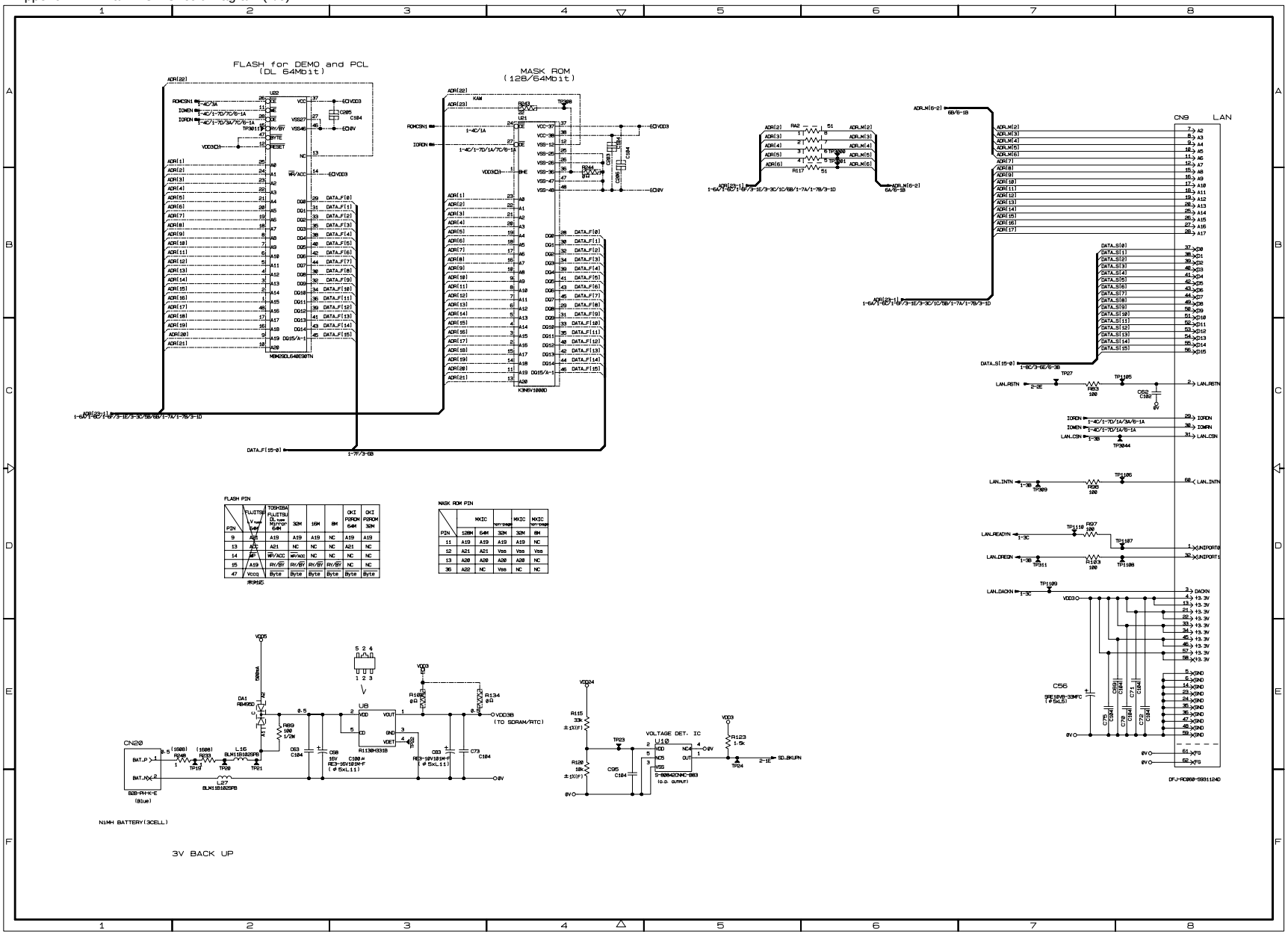
Appendix 4.2 Main PCB Circuit Diagram (2/6)



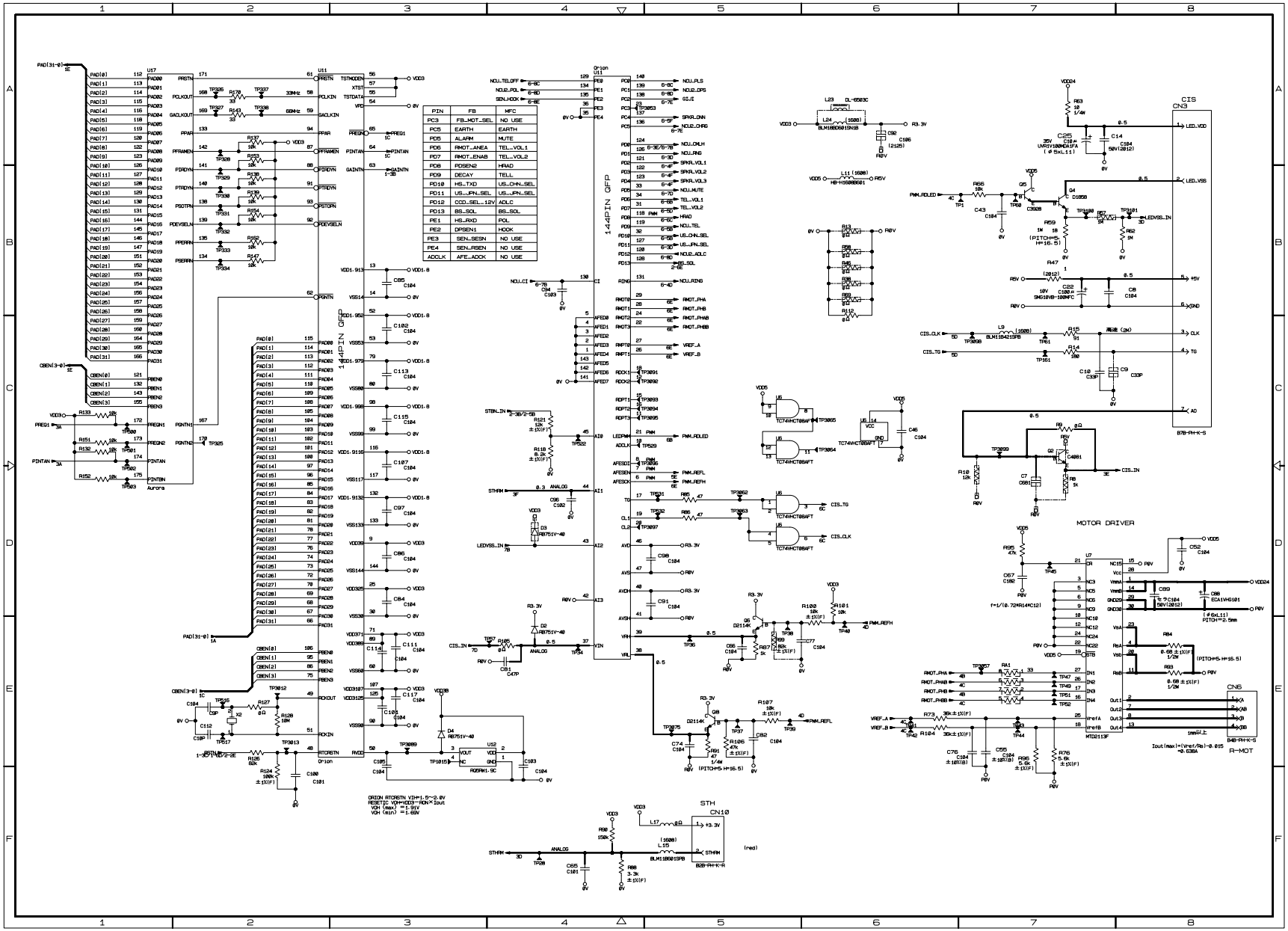
Appendix 4.3 Main PCB Circuit Diagram (3/6)



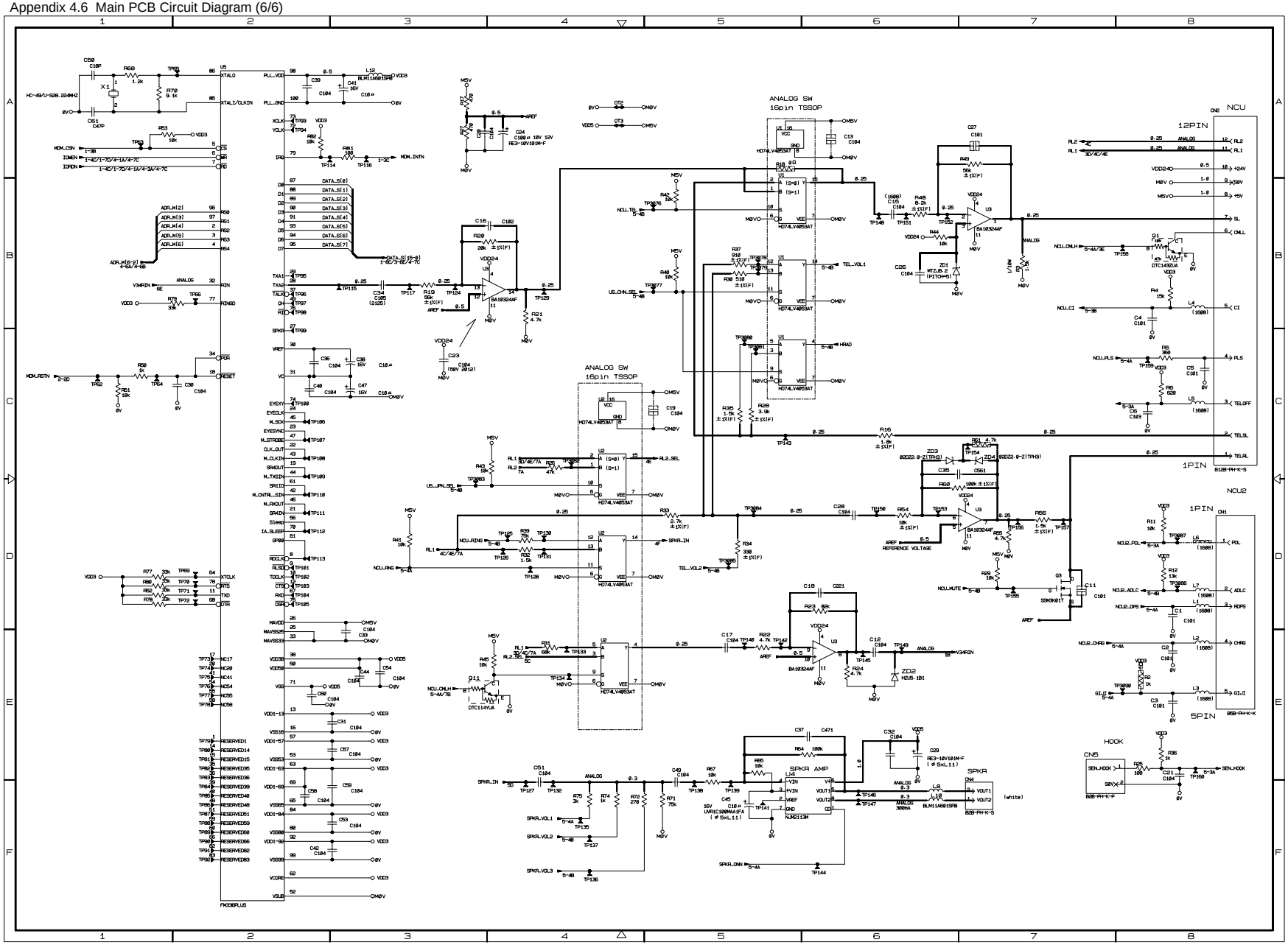
Appendix 4.4 Main PCB Circuit Diagram (4/6)



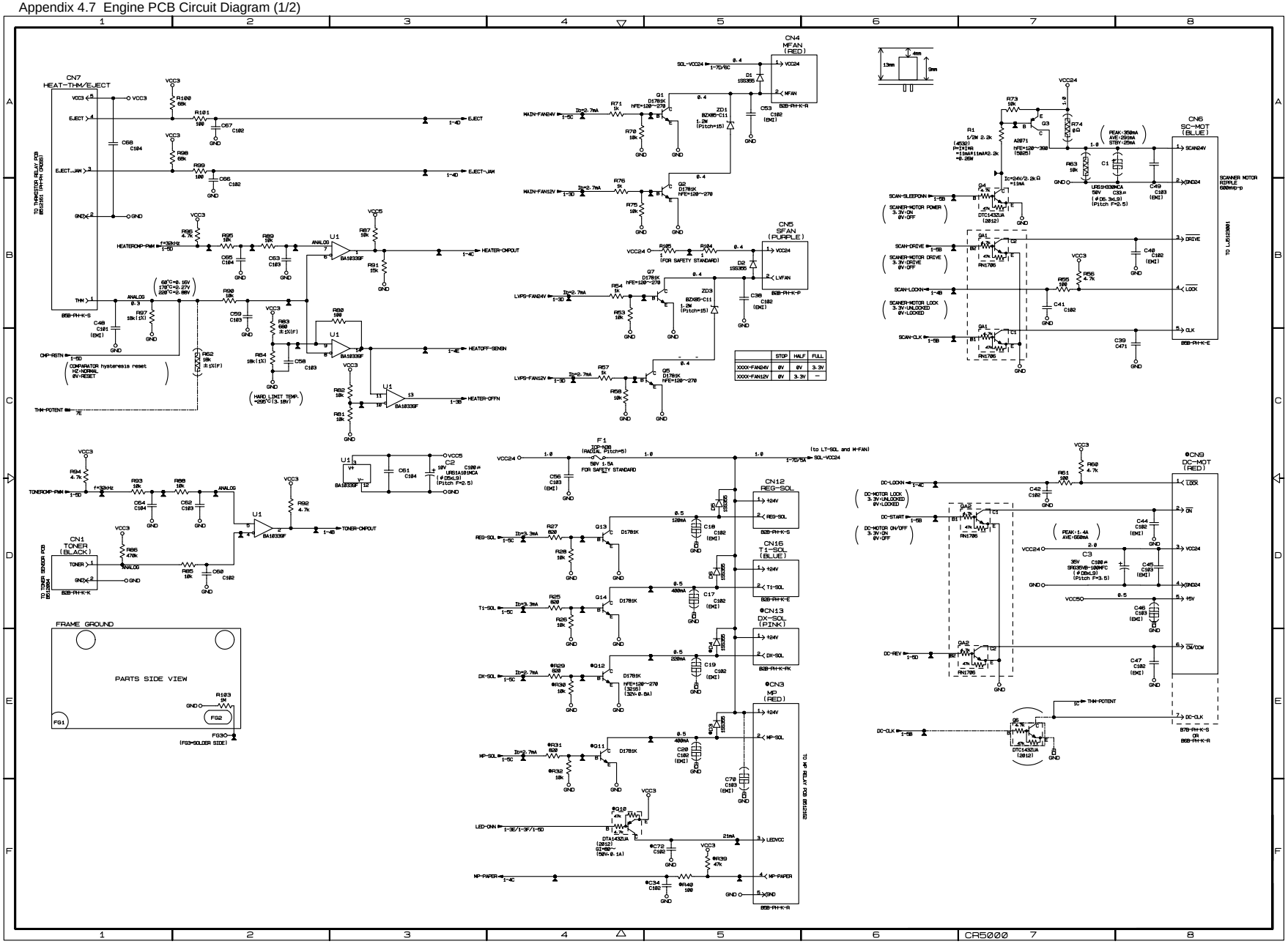
Appendix 4.5 Main PCB Circuit Diagram (5/6)



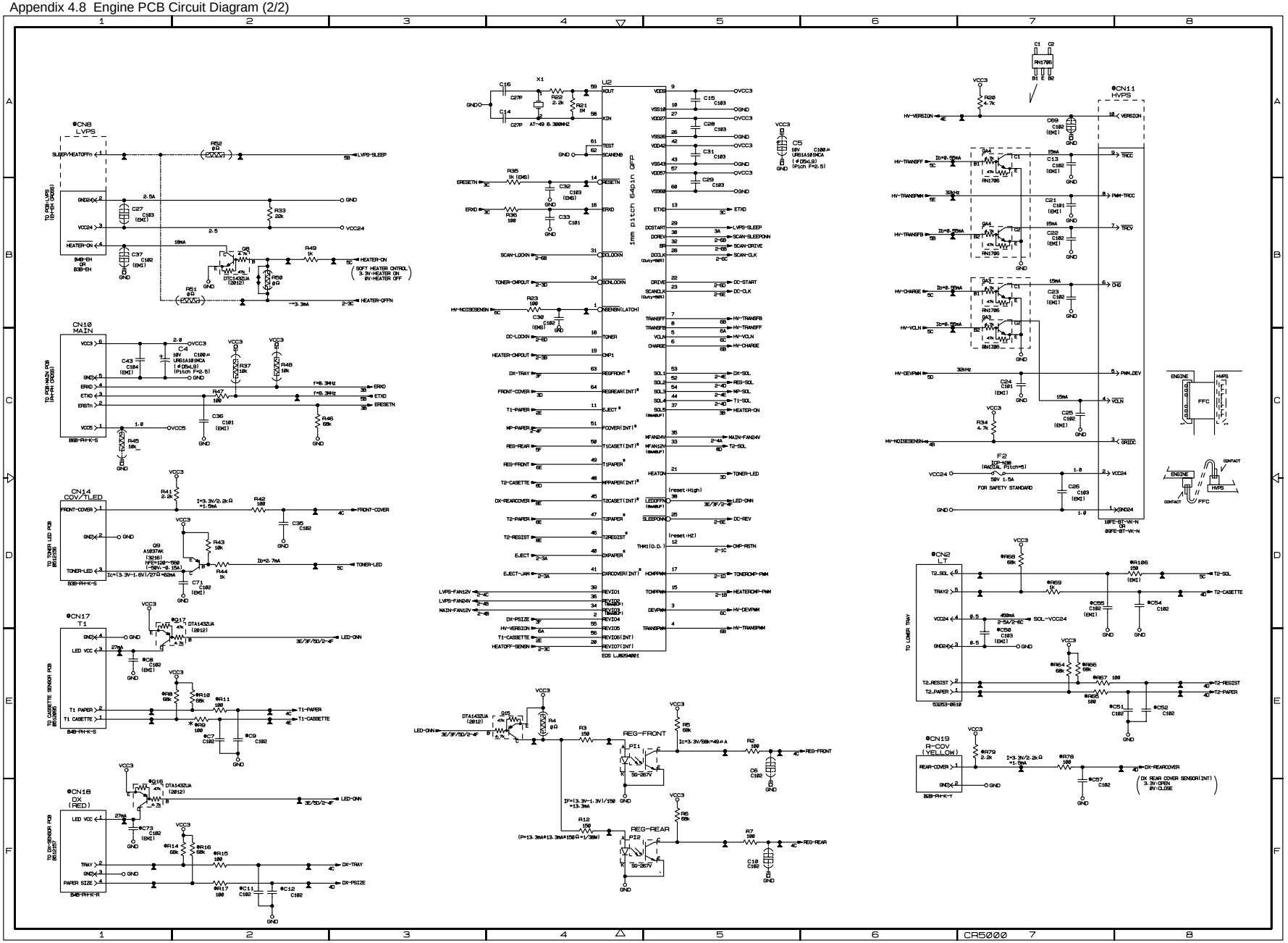
Appendix 4.6 Main PCB Circuit Diagram (6/6)



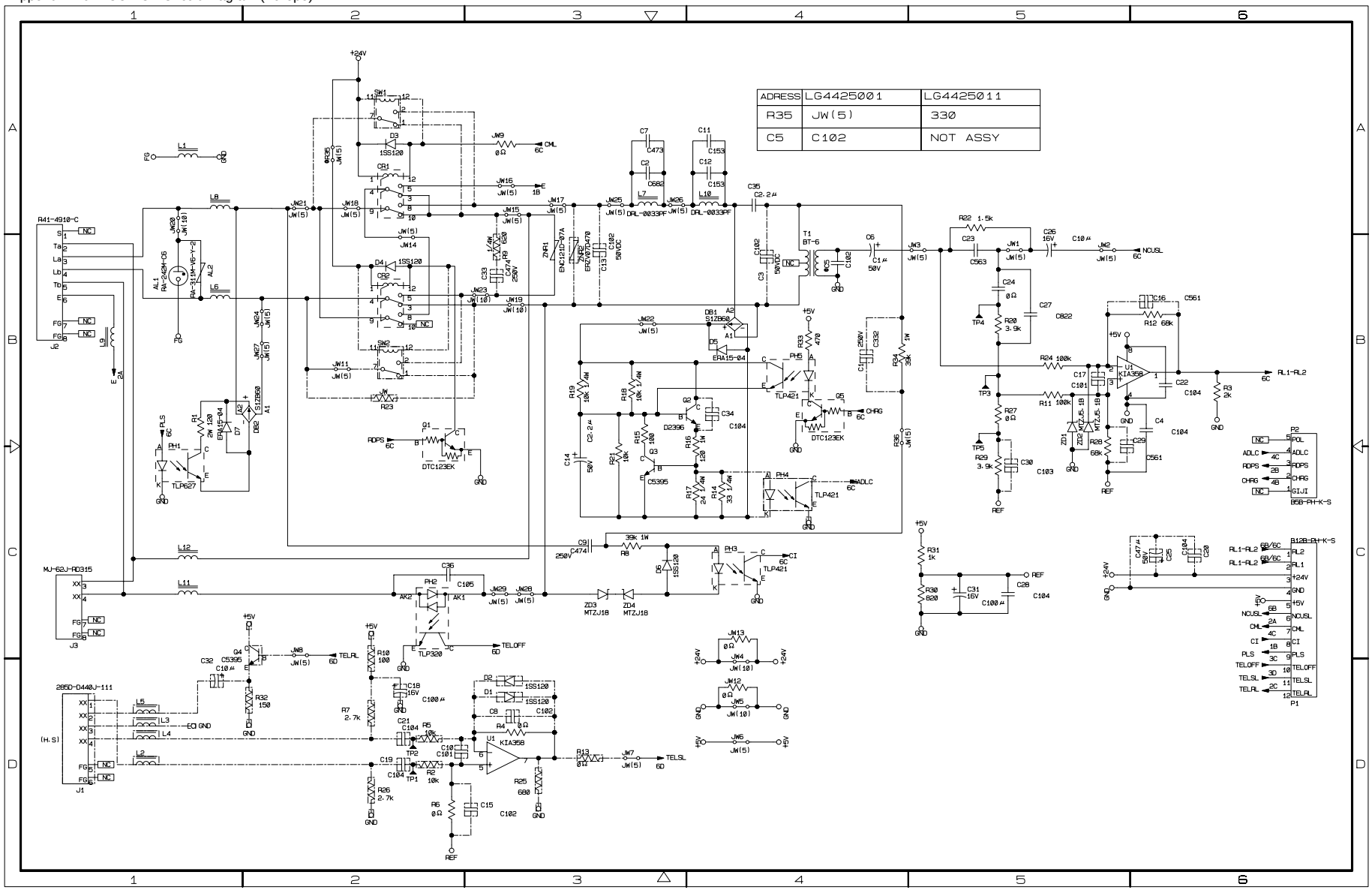
Appendix 4.7 Engine PCB Circuit Diagram (1/2)



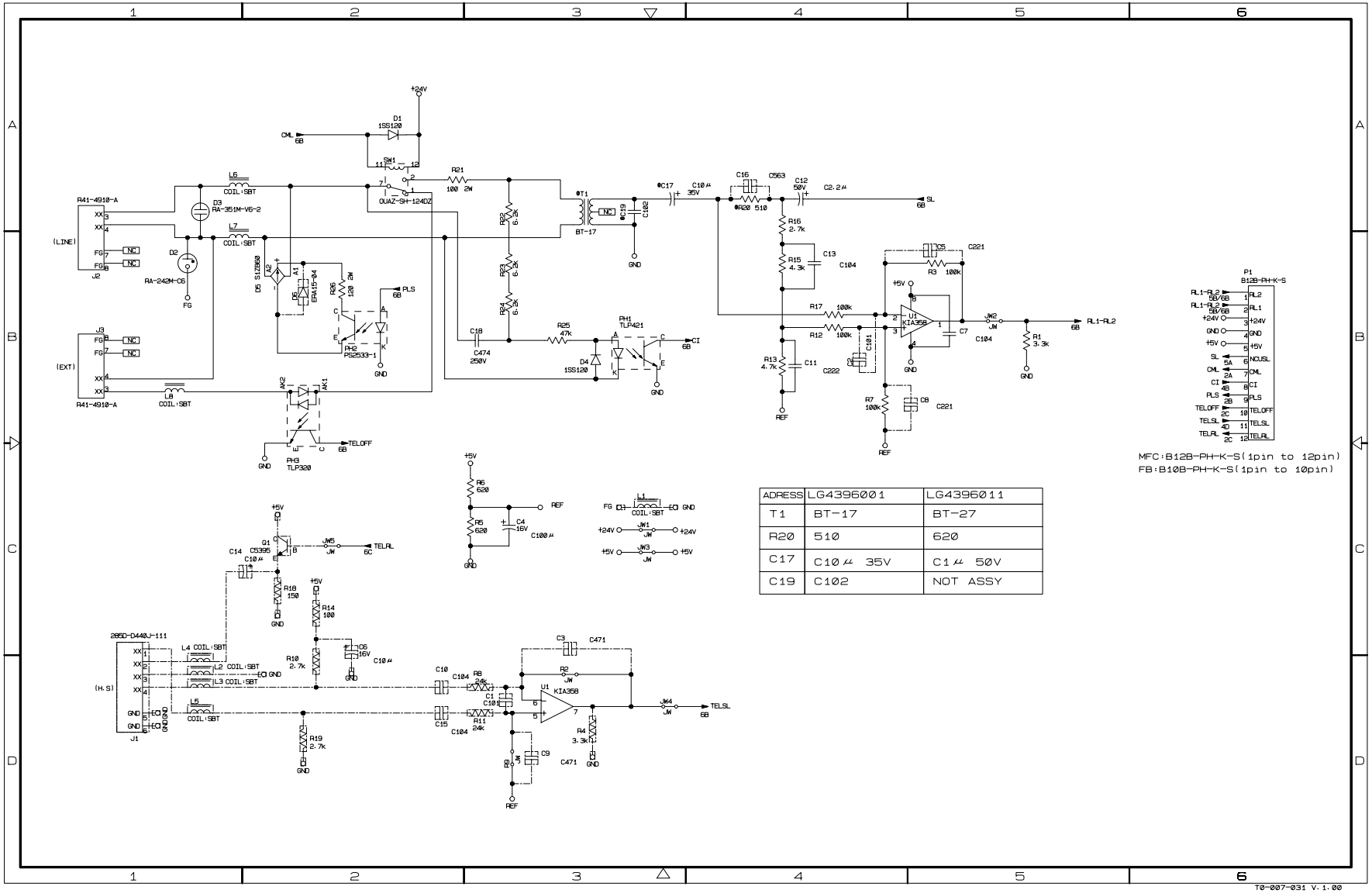
Appendix 4.8 Engine PCB Circuit Diagram (2/2)



Appendix 4.9 NCU PCB Circuit Diagram (Europe)



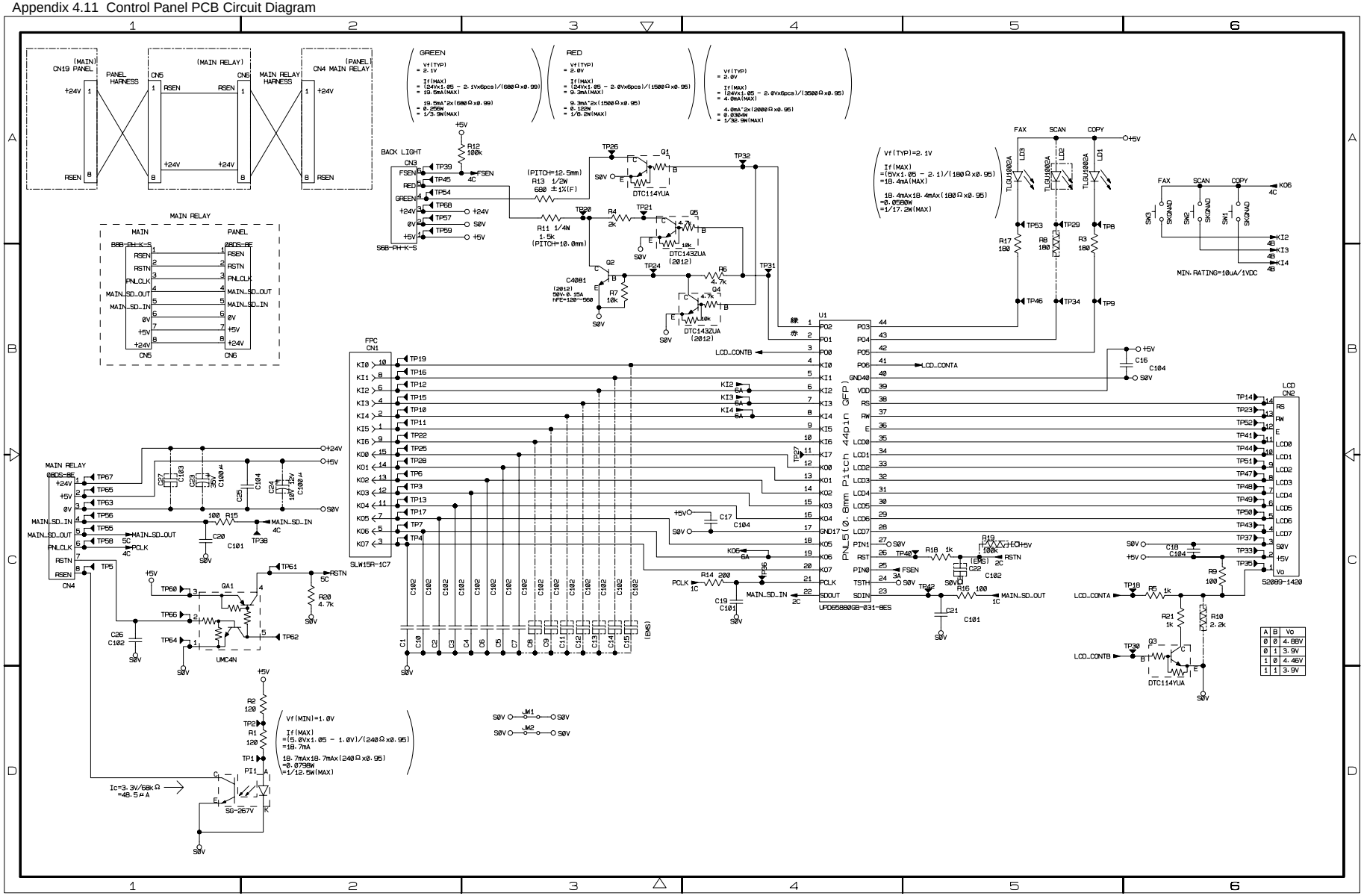
Appendix 4.10 NCU PCB Circuit Diagram (U.S.A.)



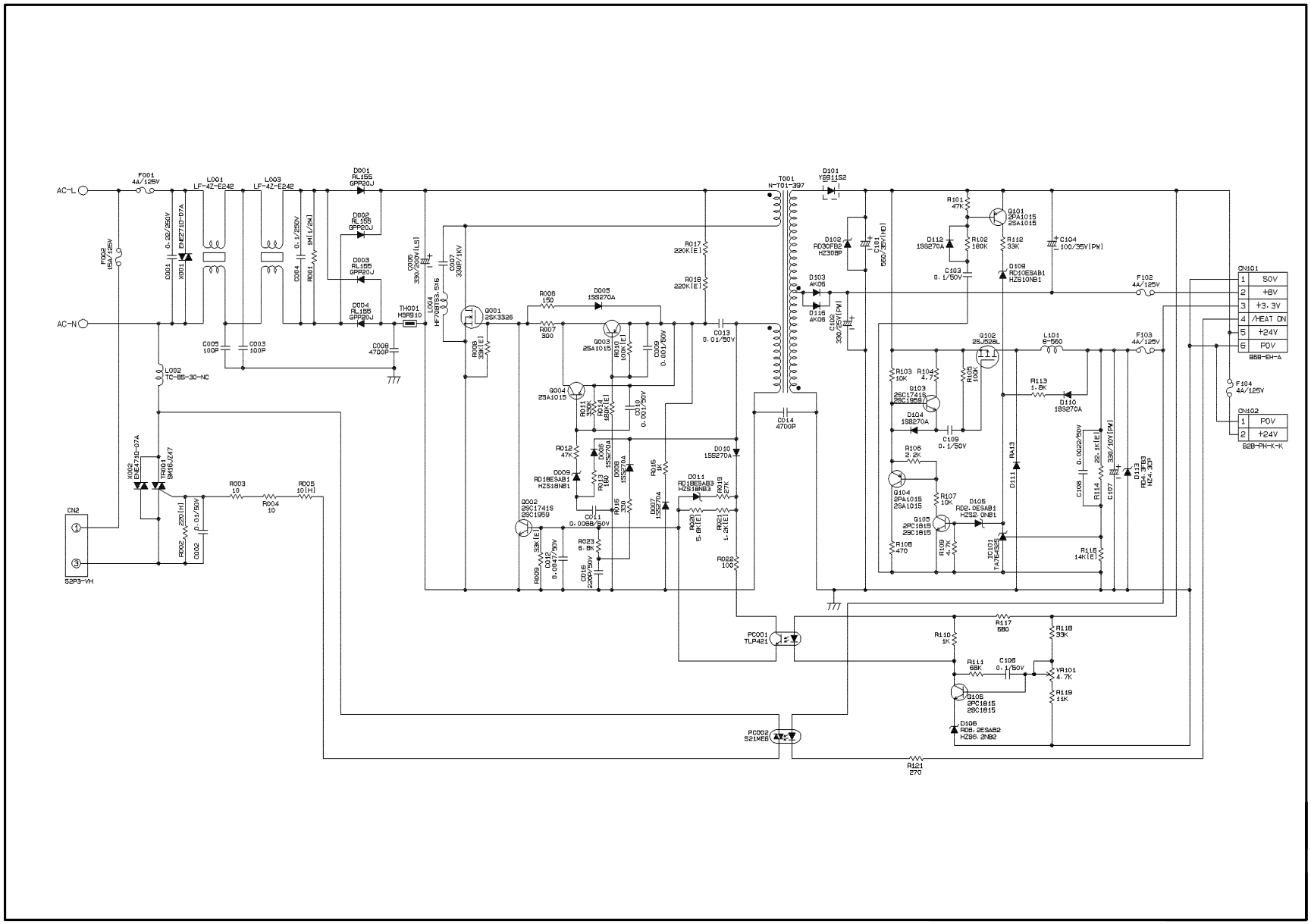
ADRESS	LG4396001	LG4396011
T1	BT-17	BT-27
R20	510	620
C17	C10μ 35V	C1μ 50V
C19	C102	NOT ASSY

T0-007-031 V.1.00

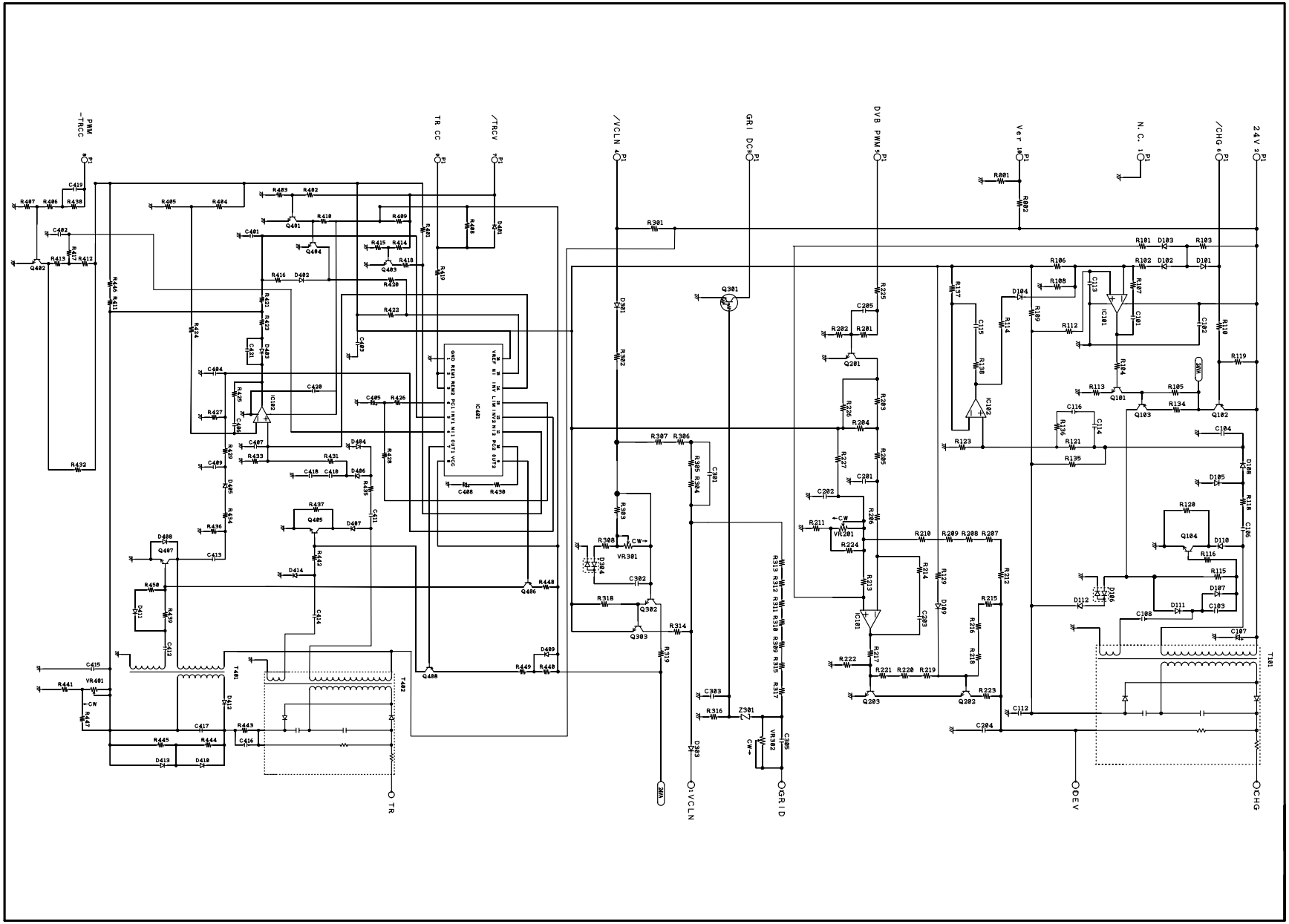
Appendix 4.11 Control Panel PCB Circuit Diagram



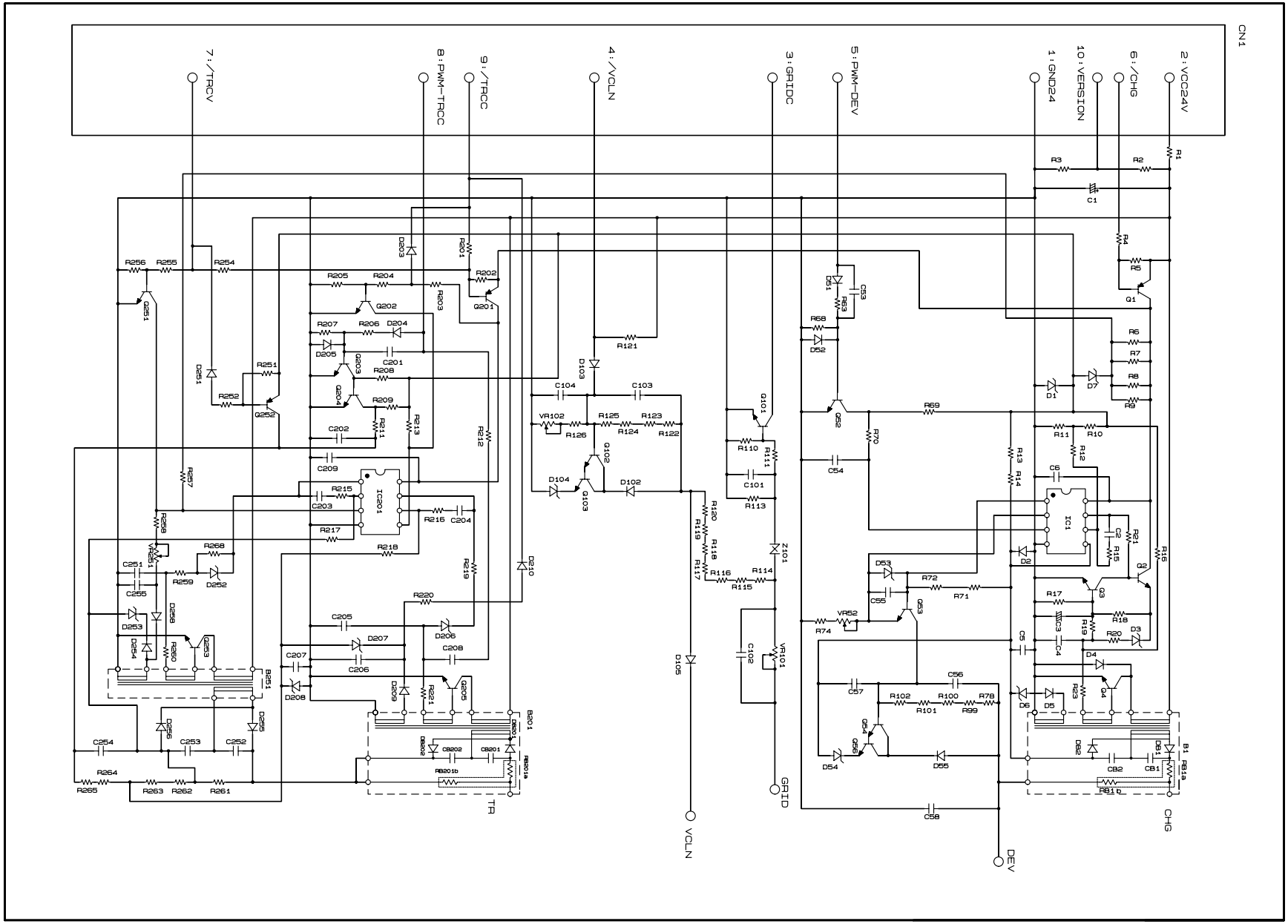
Appendix 4.12 Low-voltage Power Supply PCB Circuit Diagram



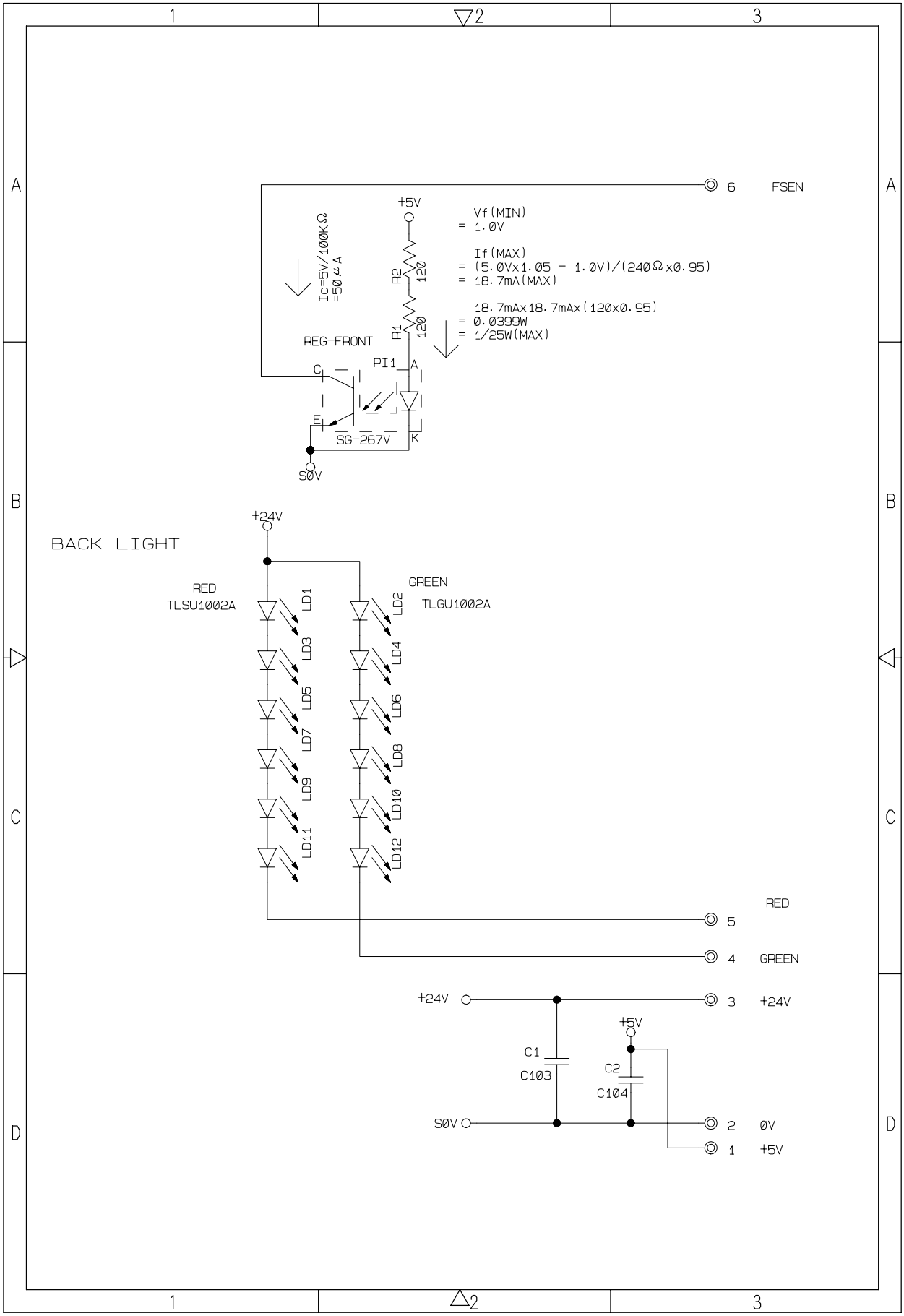
Appendix 4.13 High-voltage Power Supply PCB Circuit Diagram (100V)



Appendix 4.14 High-voltage Power Supply PCB Circuit Diagram (200V)



Appendix 4.15 Back Light PCB Circuit Diagram



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